



# **NAVAL POSTGRADUATE SCHOOL**

**MONTEREY, CALIFORNIA**

**Physical, Nutrient, and Biological Measurements of  
Coastal Waters off Central California in July 2010**

by

Thomas A. Rago, Reiko Michisaki, Baldo Marinovic, Marguerite Blum, and  
Katherine Whitaker

April 2011

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14. ABSTRACT The results of analyses of hydrographic, nutrient, and biological data collected in coastal ocean waters off Central California in July 2010 aboard the <i>NOAA Ship McArthur-II</i> are presented in both tabular and graphical form. The cruise departed from San Francisco, California, and proceeded offshore along CalCOFI Line 60 to station 90, thence southeastward to CalCOFI Line 67 at station 90, and finally shoreward along CalCOFI Line 67 to Moss Landing, California. Additionally, hydrographic and nutrient data from data collected in Monterey and Carmel Bays after completion of the track described above are presented here. Marine mammal observations were maintained throughout the cruise and are also presented here. Finally, ancillary Underway Data Acquisition System (UDAS) meteorological and surface oceanographic data are also included in this report.					
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## **Introduction**

Following in a long tradition of hydrographic studies of the California Current system-- see, for example, Steger *et al.* (2000) and Collins *et al.* (2003)-- the data in this report were collected during the 12-21 July 2010 cruise of the Pacific Coast Ocean Observing System (PaCOOS) program aboard the *NOAA Ship McArthur-II*. The PaCOOS program was organized in 2003/2004 as the NOAA west coast contribution to the national Integrated Ocean Observing System (IOOS), and is charged with “providing ocean information for the sustained use of the California Current Large Marine Ecosystem under a changing climate.”<sup>1</sup> PaCOOS cruises generally subsample the standard California Cooperative Oceanic Fisheries Investigations (CalCOFI) grid of hydrographic stations (Figure 1). This PaCOOS cruise did exactly that, sampling along CalCOFI line 60 from station 50 to station 90 [CTD casts 1-12], then along CalCOFI line 67 from station 90 to Moss Landing, California [CTD casts 16-39], with an additional three sites sampled along the transit between CalCOFI lines 60 and 67 [CTD casts 13-15] (Figure 2). To increase the resolution of the hydrographic data and to maintain the convention of similar recent PaCOOS cruises (Rago *et al.*, 2006, 2007a, 2007b, 2007c, 2008a, 2008b, 2009), eight CTD casts were also inserted between the standard CalCOFI sites along line 67 (Figure 2). Finally, a 24-hour time series of hydrographic casts, something that has not before been done during these cruises, was completed at station 67-90 [CTD casts 19-23].

Participants on the cruise came from the Naval Postgraduate School (Physical Oceanography, Marine Mammal Observations), the Monterey Bay Aquarium Research Institute (Nutrient Analysis, Primary Productivity, and Surface Drifter testing\*), University of California at Santa Cruz (Zooplankton Analysis), Stanford University (Microbiology\*), and University of Washington (Oxygen/Argon studies\*). (The asterisked activities will not be discussed within this data report.)

## **Standard Procedures**

### *CTD/Rosette Data:*

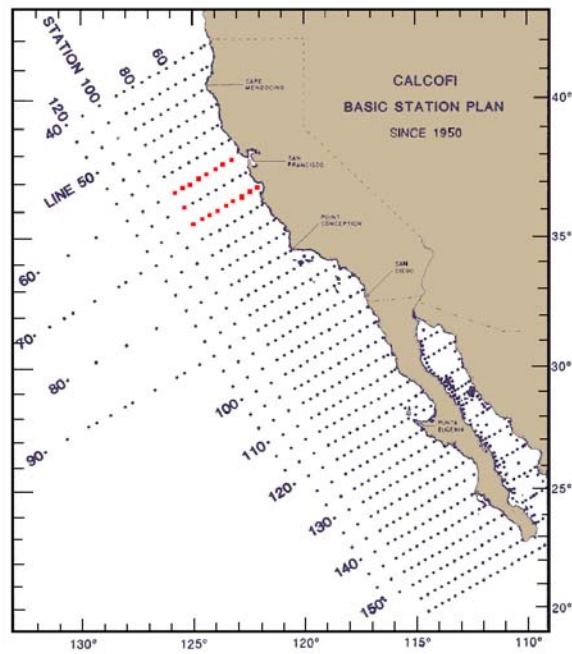
At each site a Sea-Bird Electronics, Inc., Conductivity-Temperature-Depth (CTD) instrument fitted with a 12-place rosette was deployed. The rosette was equipped with 12 10-liter PVC Niskin bottles for collection of water samples. The CTD was lowered to 1000 meters or the bottom (whichever came first), except that the CTD was lowered to near the bottom at the two offshore sites at the ends of the CalCOFI lines (67-90 and 60-90)<sup>2</sup>. Where primary productivity sampling was performed, water samples were taken at depths designed to maximize resolution of the variables sampled throughout the thermocline. Otherwise, water samples were collected so as to aid in the later conductivity/salinity calibration of the CTD conductivity sensors. A water sample was always obtained at or near the bottom of each CTD cast for that later conductivity/salinity calibration.

Besides temperature (dual sensors), conductivity (dual sensors), and pressure, the CTD also measured fluorescence, transmissivity, dissolved oxygen content, and photosynthetically available radiation (PAR) in the water column. Except for PAR and the secondary of the dual sensors, all these parameters are reported here.

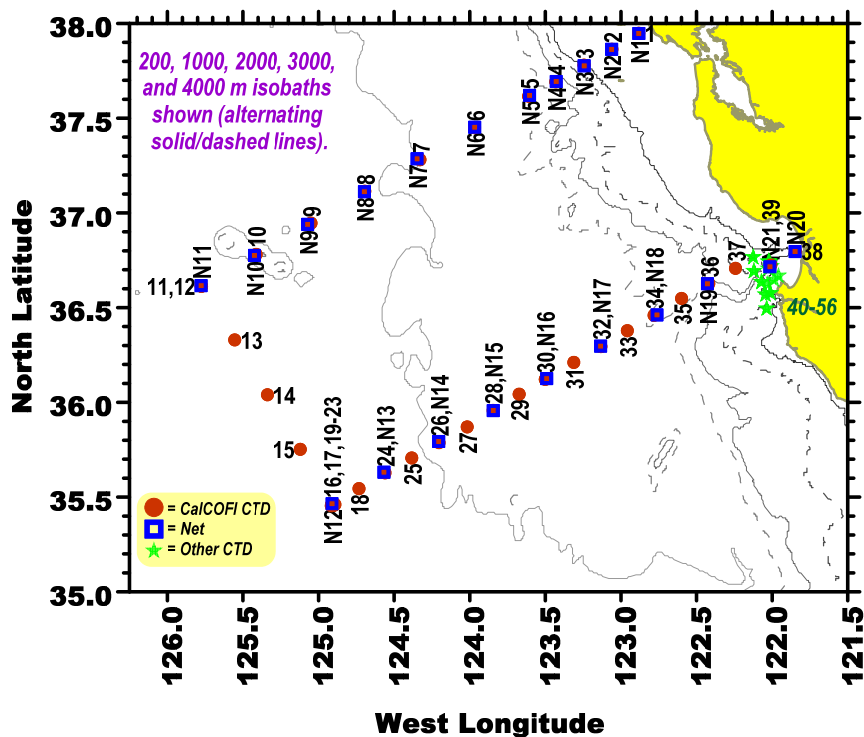
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<sup>1</sup> <http://www.pacoos.org>

<sup>2</sup> At the two offshore ends of the CalCOFI lines the CTD was lowered until only one wrap remained on the winch drum. This did not quite allow the CTD to reach the seafloor at either site.



**Figure 1:** Full CalCOFI hydrographic station grid. Stations occupied during the PaCOOS cruise of July 2010 are highlighted in red.



**Figure 2:** Hydrographic stations occupied during the PaCOOS cruise of July 2010. 200, 1000, 2000, 3000, and 4000 m isobaths are shown. Net tows were completed at sites 1-11, 21, 24, 26, 28, 30, 32, 34, 36, 38, and 39.

Generally, a minimum of two salinity samples (including the bottom-of-cast sample) were collected from each CTD cast. These samples were analyzed after the cruise at the Monterey Bay Aquarium Research Institute (MBARI) using a Guildline model 8400B Autosol salinometer. A regression between the salinometer results and the conductivities measured by the CTD at the times the Niskin bottles were tripped was made, from which a correction to the CTD salinities was determined and then applied. The salinometer was standardized using IAPSO Standard Seawater (batches P147 and P152) before and after each set of water samples was analyzed. Salinity values were calculated using the algorithms for the Practical Salinity Scale, 1978 (UNESCO, 1981).

Dissolved oxygen (Winkler) samples were collected at CTD stations 11, 17, 25, 27, 29, 31, 35, 36, 39, 40, 44, and 52-56. These were analyzed after the cruise at MBARI. The CTD for this cruise was outfitted with a Sea-Bird Electronics, Inc., SBE 43 oxygen sensor. This sensor is a polarographic membrane that outputs a voltage proportional to the temperature-compensated current flow occurring when oxygen is reacted inside the membrane. Dissolved oxygen concentration is then calculated from a modified version of the algorithm by Owens and Millard (1985). The results of the analysis of the Winkler oxygen samples were compared to the corresponding oxygen values recorded by the CTD. Using the method described in SBE Application Note #64-2<sup>3</sup>, we calculated new SBE 43 sensor coefficients. Corrected CTD oxygen values were then recalculated with the modified version of the Owens and Millard (1985) algorithm using the new sensor coefficients.

One caveat for this particular cruise is that all the deep Winkler samples collected (from CTD casts 11 and 17) turned out to be no good. Therefore, the recalculated corrected oxygens are only valid for data from the surface to about 1050 dbars. Historically, oxygen data from below 1050 dbars follow a curve (vs. pressure) that looks much more like those for the uncorrected oxygen data at CTD casts 11 and 17 than that for the corrected oxygen data at those sites. Therefore, the oxygen data listed in Table A2 for depths greater than 1050 dbars are *uncorrected* values. All other oxygen data listed in Table A2 are *corrected* values.

For this cruise, the CTD was fitted with a SeaTech<sup>4</sup> 25-cm. transmissometer. This instrument is designed to measure beam transmission over a 25 centimeter water path using a modulated Light Emitting Diode (660 nm, in this case) and a synchronous detector. The temperature compensated transmissometer is not sensitive to ambient light. (For further details concerning the SeaTech transmissometer, the introduction from its operating manual is reprinted in Appendix C.)

Often, deck values are collected during a cruise to allow correction for instrumental drift over time with a SeaTech transmissometer. That was not done during this cruise. Instead, an alternate method was used to correct for instrumental drift. For CTD casts to at least 1000 dbars<sup>5</sup>, it was assumed that the CTD always reached effectively “clear” water. According to its operating manual, the transmissometer should measure “clear” water as 91.3% transmissivity. The maximum measured transmissivity for each cast was plotted versus cast number (representing the chronological order of the casts), and a least-squares quadratic fit was made for the appropriate  $\geq 1000$  dbars casts (Figure 3). From this fit, nominal measured transmissivity maxima were calculated for each cast, from which offsets from the nominal transmissivity of “clear” water

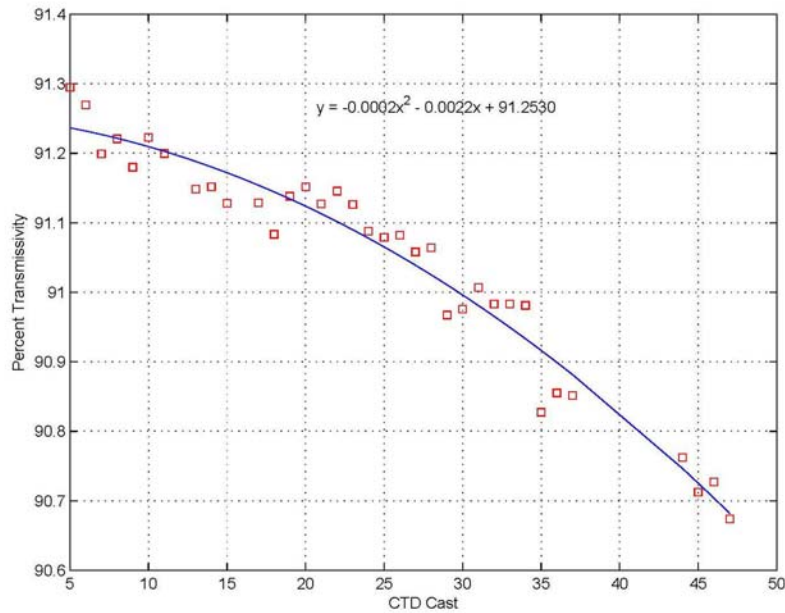
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<sup>3</sup>See **Application notes** under the **Support** tab at <http://www.seabird.com>.

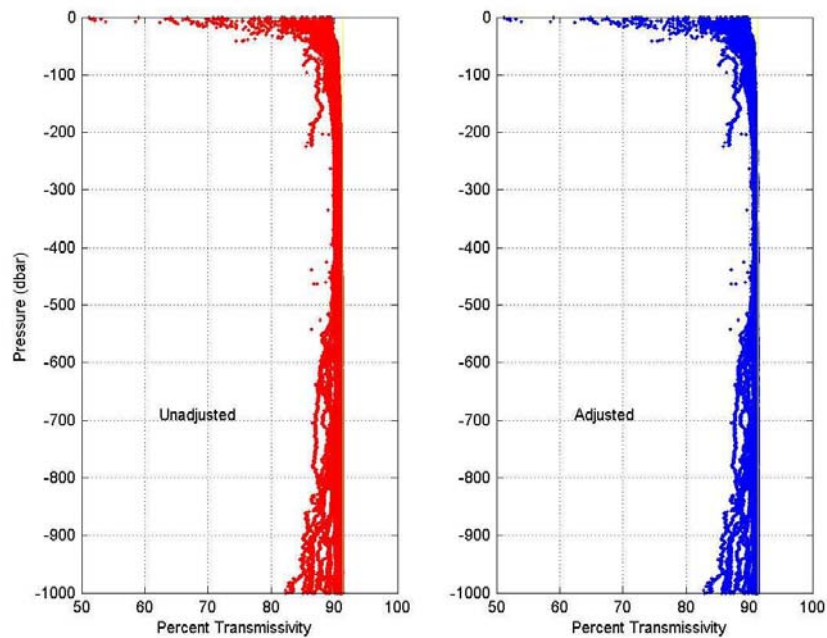
<sup>4</sup> SeaTech, Inc. was acquired by Wet Labs, Inc., in late 1998.

<sup>5</sup> The exceptions were 1000-m CTD casts 4, 39-41, and 43, which at 1000 dbars were sufficiently close to the bottom to experience increased turbidity from the nepheloid layer stirred up at the mouths of the Monterey or Carmel Canyons or along the slope of the continental slope.

(91.3%) were calculated for each cast (Table 1). Finally, offsets were applied to the CTD casts, giving the results shown in Figure 4.



**Figure 3:** *Transmissivity maxima by CTD cast measured by the SeaTech 25-cm transmissometer. A least squares quadratic fit was applied to the data.*



**Figure 4:** *Corrected (blue) and uncorrected (red) transmissivities. This shows all the transmissivity measurements made for all CTD casts during the PaCOOS cruise of July 2010.*

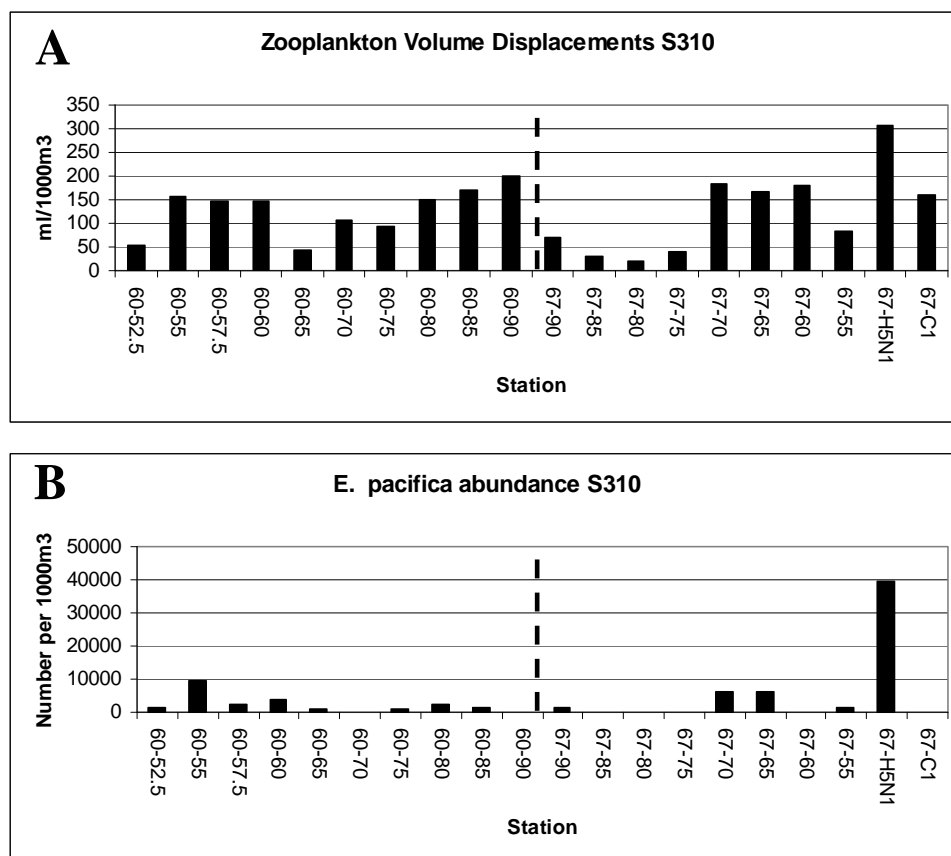
**Table 1:** *Transmissivity offsets applied to each CTD cast during the PaCOOS cruise of July 2010. a = shallow cast (did not reach “clear” water); b = turbidity effects near continental shelf and slope; c = turbidity effects in Monterey Canyon (CTD station H3); d = turbidity effects in Carmel Canyon.*

CTD Cast	Maximum Transmissivity (%) (measured by CTD)	Maximum Transmissivity (%) (predicted from line fit)	Calculated Transmissivity Offset (%) (91.3 - predicted value)
1	a	91.251	0.049
2	a	91.248	0.052
3	a	91.244	0.057
4	b	91.241	0.059
5	91.295	91.237	0.064
6	91.270	91.232	0.068
7	91.199	91.227	0.073
8	91.221	91.222	0.078
9	91.180	91.216	0.084
10	91.223	91.210	0.091
11	91.200	91.203	0.097
12	a	91.196	0.104
13	91.148	91.188	0.112
14	91.152	91.180	0.120
15	91.128	91.172	0.128
16	a	91.163	0.137
17	91.129	91.154	0.146
18	91.083	91.144	0.156
19	91.138	91.134	0.166
20	91.152	91.124	0.176
21	91.127	91.113	0.187
22	91.146	91.102	0.198
23	91.126	91.090	0.210
24	91.088	91.078	0.222
25	91.079	91.065	0.235
26	91.082	91.052	0.248
27	91.058	91.039	0.261
28	91.064	91.025	0.275
29	90.967	91.011	0.289
30	90.976	90.996	0.304
31	91.007	90.981	0.319
32	90.983	90.965	0.335
33	90.983	90.950	0.351
34	90.981	90.933	0.367
35	90.827	90.916	0.384
36	90.855	90.899	0.401
37	90.852	90.882	0.419
38	a	90.863	0.437
39	c	90.845	0.455
40	d	90.826	0.474
41	d	90.807	0.493
42	d	90.787	0.513
43	d	90.767	0.533
44	90.762	90.746	0.554
45	90.712	90.725	0.575
46	90.727	90.704	0.596
47	90.674	90.682	0.618
48	a	90.660	0.640
49	d	90.637	0.663
50	d	90.614	0.686
51	a	90.590	0.710
52	a	90.567	0.734
53	a	90.542	0.758
54	a	90.517	0.783
55	a	90.492	0.808
56	a	90.467	0.834

Nutrient samples were collected during the PaCOOS cruise in 45-ml polypropylene screw-capped containers which were rinsed three times prior to filling. Samples were frozen and returned to MBARI for later analysis on an AlpChem autoanalyzer, as in Sakamoto *et al.* (1990).

Chlorophyll-*a* and phaeopigments were collected during the PaCOOS cruise in 280-ml polyethylene bottles and filtered onto 25-mm Whatmann GF/F filters. Chlorophyll-*a* was assayed with the standard fluorometric procedure of Holm-Hansen *et al.* (1965), modified such that phaeopigments are extracted in acetone in a freezer over at least 24 hours (Venrick and Hayward, 1984; Chavez *et al.*, 1991). Analysis was performed as possible during the cruise or at MBARI immediately following the cruise.

Primary productivity during the PaCOOS cruise was estimated for the 100, 50, 30, 15, 5, 1, and 0.1% light penetration depths as determined by secchi, and followed the general method of Parsons *et al.* (1984). Water samples from the appropriate depths were collected in 280-ml polycarbonate bottles, spiked with  $^{14}\text{C}$ , and incubated on deck for 24 hours under running seawater in plexiglass tubes wrapped with nickel-cadmium screens of differing pore size. (See Pennington and Chavez, 2000, for methodology details.)



**Figure 5:** Displacement volumes (A) and krill (*Euphausia pacifica*) abundance (B) along CalCOFI Lines 60 and 67 for July 2010. Dotted lines depict the break between Line 60 and Line 67, and represent a shift from onshore-offshore direction to offshore-onshore direction.

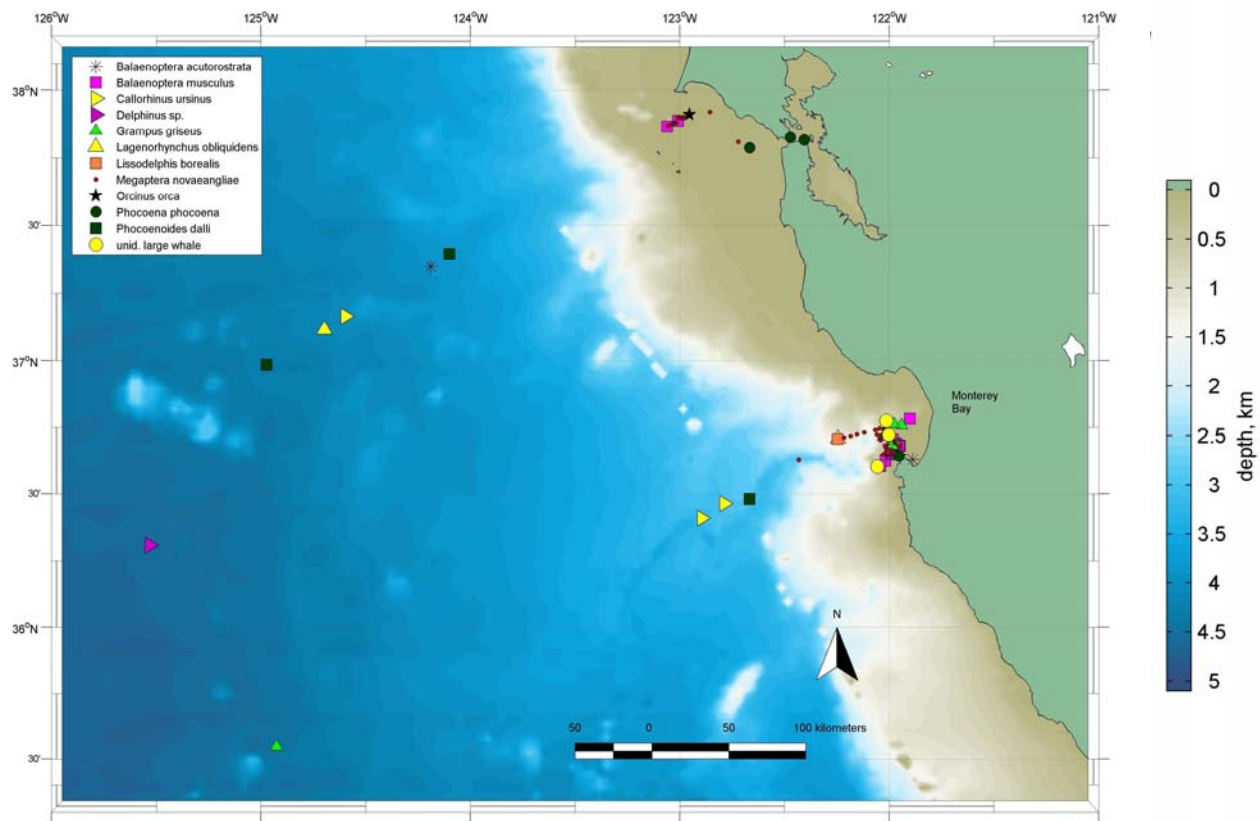


### *Zooplankton Net Tows:*

Twenty-one stations<sup>6</sup> (Figure 2), eleven along CalCOFI Line 60 and ten along line 67, were sampled for zooplankton abundance during the cruise. All sampling was conducted with 0.7-m diameter paired bongo nets fitted with 505-mm mesh, which were towed obliquely to a depth of 210 m (or within 10 m of the bottom, whichever came first). Samples were preserved at sea according to standard protocols (Kramer *et al.*, 1972). Zooplankton displacement volumes demonstrated different spatial distributions between Line 67 and Line 60. Biovolumes demonstrated a relatively even onshore-offshore distribution along Line 60, while they tended to be more concentrated inshore along Line 67 (Figure 5a). In contrast, concentrations of the most abundant krill species (*Euphausia pacifica*) tended to be highest along the inshore portions of both Lines 60 and 67 (Figure 5b), although the inshore/offshore disparity was markedly less along Line 60. Both these results may reflect stronger ekman transport-driven offshore advection typically associated with the Pt. Reyes headland, which is located just to the north of Line 60.

### *Marine Mammal Observations:*

Observations of marine mammals (Figure 6, Tables A4 and A5) were made by a single observer during daylight hours (approximately 1300 to 0300 Coordinated Universal Time [UT]) throughout



**Figure 6.** Marine mammal sightings during the PaCOOS cruise of July 2010.

<sup>6</sup> CTD stations 1-11, 21, 24, 26, 28, 30, 32, 34, 36, 38, and 39.



the cruise, conditions permitting<sup>7</sup> (e.g., clear or high clouds, Beaufort state less than 4, etc.). Observations were made from the forward observation stations on the 04-deck flying bridge (above the Bridge), where eye height was approximately 30 meters above the sea surface, using handheld Fujinon 7 x 50 binoculars with compass for bearing and reticle for distance. Also used during this cruise for longer distance scans and mammal identifications were two pairs of Big Eye Binoculars<sup>8</sup> (100 x 25 power). Generally, the observer would scan from 90° to port to 90° to starboard. Observations were recorded on a laptop computer using the marine mammal and bird mapping program *Seebird* (developed at the Southwest Fisheries Science Center). This program interfaces with handheld global positioning system (GPS) devices, and allows the generation of observation logs containing the observations of the mammals themselves with matching ship's velocities and positions, observational conditions, etc. Generally, intensive "on effort" observations were made during the last half of each half-hour period, with the other half of the half-hour period devoted to less intensive "off effort" observations. Depending on the situation, the observer would take short breaks from the observations approximately every two hours.

#### *Ancillary Observations:*

*Underway Data:* Near surface measurements of temperature and salinity were recorded throughout the cruise from water pumped through the ship's uncontaminated seawater system. These data were recorded at approximately 60-second intervals throughout the PaCOOS cruise. Table A1 lists these data at the start of each hydrographic station.

### **Tabulated Data (in Appendix A)**

The following tables of data can be found in Appendix A:

1) *Table A1: Meteorological and Sea Surface Data*

This lists the meteorological and surface oceanographic conditions at the start of each hydrographic station as measured by the underway data acquisition systems of the *NOAA Ship McArthur-II*.

2) *Table A2: Hydrographic Data*

This is a chronological listing of the hydrographic data collected at each CTD station during the cruise. Data are given for standard pressures, except that the last line of data for each site is the deepest pressure for that CTD cast. The surface pressure, listed as 0 dbar, is actually 1 dbar. Salinities (oxygen) have been adjusted according to the conductivity/salinity (oxygen) calibration correction determined from the collected salinity (oxygen/Winkler) water samples, except that oxygens deeper than 1050 dbars have not been adjusted. Transmissivities have been adjusted according to the method described earlier in this report. The time listed for each station is the beginning (UT) of the CTD cast. Units of geopotential anomaly ( $\Delta\Phi$ ), potential density ( $\sigma_\theta$ ), and potential spiciness ( $\pi_\theta$ ) are  $\text{m}^2\text{s}^{-2}$ ,  $\text{kg m}^{-3}$ , and  $\text{kg m}^{-3}$ , respectively.

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<sup>7</sup> And sometimes when not so permitting!

<sup>8</sup> Thanks to the Monterey Sanctuary Foundation for supplying this equipment.

3) *Table A3: Nutrient and Primary Productivity Data*

This is a chronological listing of the results of the nutrient and primary productivity analyses of the water samples collected from the 12 Niskin bottles tripped at each hydrographic station during the PaCOOS cruise of July 2010. The time given is the start (UT) for each hydrographic station. The data for each hydrographic station are separated into three sections (“Physical and Chemical,” “Biological,” and “Integrated Values”).

The physical oceanographic properties listed in the first seven columns of the “Physical and Chemical” section of each station’s data are the uncorrected values measured by the CTD at the times each Niskin bottle was tripped. Because they are uncorrected, these values may differ slightly from those listed in Table A2. The last four columns of this section of each station’s data give the nitrate (NO<sub>3</sub>), nitrite (NO<sub>2</sub>), phosphate (PO<sub>4</sub>), and dissolved silicate (SiO<sub>4</sub>) concentrations (determined as described previously).

The “Biological” section of each station’s data give the results of the nutrient and primary productivity analyses, while the “Integrated Values” section sums the nutrient and primary productivity results over the water column to the depth at which light intensity reaches 1% of its surface value.

4) *Table A4: Marine Mammal Data*

This table lists the results of the marine mammal observations made during the PaCOOS cruise of July 2010. The data are listed alphabetically by species’ scientific name, then chronologically within each species.

5) *Table A5: Marine Mammal Data Summary*

This table summarizes the results from Table A4 of the marine mammal observations made during the PaCOOS cruise of July 2010. The data are listed alphabetically by species’ scientific name.

**Figures of Results (in Appendix B)**

Graphical representations of the data collected during this cruise follow the tabulated data in Appendix A.

Figure 7 is a series of four diagrams contouring (a) the temperature (°C), (b) the salinity, (c) the density anomaly (kg m<sup>-3</sup>), and (d) the oxygen (μmol kg<sup>-1</sup>) fields along the line of hydrographic stations from Moss Landing, California, to Drakes Bay, California.

Figure 8 is a series of two diagrams that contours the fluorescence and transmissivity in the upper 100 dbars of the water column along the same line of hydrographic stations as in Figure 7 from Moss Landing to Drakes Bay, California.

Figure 9 is a series of four diagrams contouring the (a) nitrate (μM), (b) nitrite (μM), (c) phosphate (μM), and (d) silicate (μM) fields along the line of hydrographic stations from Moss Landing to Drakes Bay, California.

Figure 10 is a series of three diagrams that contours the primary productivity (upper panel), chlorophyll-a concentration (middle panel), and primary productivity index (lower panel) in the upper 60 meters of the water column along the line of hydrographic stations from Moss Landing to Drakes Bay, California. The primary productivity and primary productivity index were estimated

for the 100, 50, 30, 15, 5, 1, and 0.1% light penetration depths as determined by secchi. These light penetration depths are indicated in the bottom diagram of the figure.

### **Cruise Participants**

<b>Scientist</b>	<b>Duties</b>	<b>Affiliation</b>
Tim Pennington (Chief Sci.)	Nutrients, Primary Productivity	Monterey Bay Aquarium Research Institute
<i>Marguerite Blum</i>	<i>Nutrients, Primary Productivity, Oxygens</i>	
Jamie Flagg	Nutrients	
<i>Roman Marin IV</i>	<i>Nutrients</i>	
Alyssia Farasopoulos	Nutrients	
<i>Chris Wahl</i>	<i>Drifters</i>	
Curt Collins	Physical Oceanography	Naval Postgraduate School
<i>Tarry Rago</i>	<i>Physical Oceanography</i>	
Katherine Whitaker	Marine Mammal Observer	
<i>Alexandra Buettner</i>	<i>Nutrients</i>	
LT Cynthia Madden, USN	Nutrients	
Eric Ettner	Phytoplankton Net Tows	University of California, Santa Cruz
Jason Smith	Microbiology	Stanford University
Rachel Emswiler	Oxygen/Argon Studies	University of Washington

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## Appendix A

**Table A1:** *Meteorological and sea surface data collected during the PaCOOS cruise of July 2010.* Listed here are the meteorological and surface oceanographic conditions as measured by the underway data acquisition system (UDAS) of the *NOAA Ship McArthur-II* at the beginning of each hydrographic station. Continuous measurements of the water being pumped through the ship's uncontaminated seawater system ("sea chest") from approximately 3 meters below the surface supplied the oceanographic data, while instrumentation atop the ship's mast supplied the meteorological data. The sea surface salinities (SSS) are on the order of 0.1 less than the corresponding 3-meter CTD salinity values.

Station	Yearday, 2007 (UTC)	Barometric Pressure (mb)	Wind Speed (kts)	Wind Direction (°T)	SST (°C)	SSS
1	194.0556	1013.93	6.36	184.07	na	na
2	194.1354	1013.80	5.45	158.96	13.429	33.680
3	194.2368	1014.20	8.63	175.98	13.502	33.610
4	194.3083	1014.31	7.24	188.39	13.951	33.558
5	194.4437	1013.95	9.09	214.94	14.161	33.576
6	194.6000	1014.39	3.01	211.36	13.516	33.440
7	194.7528	1014.54	3.90	338.24	13.676	32.896
8	194.9292	1013.93	3.46	047.12	14.649	32.878
9	195.0722	1013.22	5.65	043.38	13.203	32.941
10	195.2153	1014.43	7.70	023.36	13.755	32.433
11	195.3632	1014.78	11.55	048.29	14.296	32.447
12	195.5542	1015.09	13.19	021.40	14.268	32.459
13	195.6646	1015.93	8.27	093.69	15.601	32.939
14	195.7931	1016.47	2.80	180.40	14.894	32.839
15	195.9306	1015.74	1.30	132.09	16.478	na
16	196.0667	1015.22	5.38	275.60	16.835	32.863
17	196.1292	1015.07	7.09	267.48	16.303	32.870
18	196.2924	1016.10	5.36	292.85	16.627	32.790
19	196.5014	1016.02	8.60	269.23	16.224	32.866
20	196.8097	1017.72	7.80	284.06	16.936	32.849
21	197.1111	1016.46	13.58	321.17	16.773	32.814
22	197.3042	1017.75	13.24	300.76	16.518	32.818
23	197.5049	1017.09	15.38	312.36	16.294	32.827
24	197.6417	1017.62	19.44	289.70	16.122	32.844
25	197.7528	1017.81	17.78	306.02	15.876	32.803
26	197.8562	1017.57	18.54	304.16	15.789	32.762
27	197.9736	1016.77	18.13	301.68	15.623	32.805
28	198.0715	1016.26	18.53	294.97	15.574	32.809
29	198.1799	1016.87	15.07	300.58	15.459	32.804
30	198.2653	1017.23	13.24	287.70	15.059	32.801
31	198.3819	1016.34	15.02	311.53	14.655	33.465
32	198.4715	1016.11	13.96	311.28	14.306	33.056
33	198.5847	1016.66	10.99	316.34	14.779	33.331
34	198.6687	1016.85	9.63	312.13	14.273	33.436
35	198.7764	1016.82	10.64	333.71	15.169	33.270
36	198.8514	1016.44	10.86	317.66	14.849	33.243
37	198.9646	1015.36	15.78	317.45	13.985	33.344
38	199.1347	1014.72	10.70	268.22	14.922	33.470
39	199.2167	1015.26	12.91	294.25	14.128	33.528
40	199.5090	1014.39	12.54	324.35	14.136	33.494
41	199.6764	1015.13	10.27	328.42	14.508	33.549
42	199.8368	1015.33	12.54	313.50	14.168	33.496

Station	Yearday, 2007 (UTC)	Barometric Pressure (mb)	Wind Speed (kts)	Wind Direction (°T)	SST (°C)	SSS
43	199.9882	1013.52	21.74	304.25	13.478	33.638
44	200.1736	1012.73	21.57	324.68	12.963	33.440
45	200.2410	1013.55	16.75	320.94	13.116	33.376
46	200.2958	1013.54	14.17	319.34	12.898	33.551
47	200.3549	1013.03	13.11	335.72	14.269	33.493
48	200.6694	1013.78	14.49	328.52	13.178	33.626
49	200.8000	1014.23	14.97	310.84	13.256	33.628
50	200.9646	1013.13	17.25	293.62	12.643	33.495
51	201.1076	1012.85	11.52	282.03	13.653	33.581
52	201.2958	1012.68	10.28	327.93	13.940	33.571
53	201.5049	1012.13	10.40	343.52	13.712	33.520
54	201.6257	1012.59	13.10	315.56	12.387	33.534
55	201.7979	1013.40	7.12	266.24	12.498	33.557
56	202.1076	1011.88	7.38	279.27	13.009	33.571

**Table A2:** *List at standard pressures of hydrographic data collected during the PaCOOS cruise of July 2010. Stations are in chronological order, with the last station being CTD 56 on 21 July 2010. For each cast, the surface pressure (listed as 0 dbar) is actually 1 dbar, while the last pressure is the deepest pressure of the cast. Salinities and oxygens have been adjusted according to the calibration corrections determined from the collected salinity and oxygen water samples, except that oxygens deeper than 1050 dbar remain unadjusted. (See main text.) Transmissivities have been adjusted according to the methods outlined within the text of this report. The time listed for each station is the beginning (<mm/dd/yyyy, hhmm> UTC) of the CTD cast. Units of geopotential anomaly ( $\Delta\Phi$ ), potential density ( $\sigma_\theta$ ), and potential spiciness ( $\pi_\theta$ ) are  $\text{m}^2\text{s}^{-2}$ ,  $\text{kg m}^{-3}$ , and  $\text{kg m}^{-3}$ , respectively. The standard CalCOFI grid of stations runs from CTD 1 through CTD 39.*

**Station:** 1   **Date:** 7/13/2010, 0120   **Lat.:** 37° 56.91 N   **Long.:** 122° 52.96 W

P(dbar)	T(°C)	S	O <sub>2</sub> ( $\mu\text{m/kg}$ )	Xmiss(%)	$\Delta\Phi$	$\sigma_\theta$	$\pi_\theta$
0	14.024	33.544	485.0	51.2	0.029	25.057	0.762
10	12.708	33.678	329.1	71.4	0.280	25.426	0.596
20	10.378	33.816	195.6	87.2	0.506	25.963	0.268
30	9.754	33.875	146.2	88.3	0.700	26.115	0.207
42	9.399	33.943	90.7	74.5	0.918	26.227	0.202

**Station:** 2   **Date:** 7/13/2010, 0314   **Lat.:** 37° 51.82 N   **Long.:** 123° 03.58 W

P(dbar)	T(°C)	S	O <sub>2</sub> ( $\mu\text{m/kg}$ )	Xmiss(%)	$\Delta\Phi$	$\sigma_\theta$	$\pi_\theta$
0	12.994	33.803	388.2	59.0	0.025	25.467	0.753
10	10.843	33.871	276.0	85.7	0.229	25.925	0.394
20	10.241	33.866	251.5	85.2	0.430	26.026	0.284
30	9.956	33.900	229.8	87.5	0.624	26.101	0.261
50	9.386	33.920	157.6	89.0	0.997	26.212	0.181
75	8.738	33.986	70.0	85.8	1.430	26.367	0.128
84	8.757	33.999	50.7	85.2	1.579	26.374	0.142

**Station:** 3   **Date:** 7/13/2010, 0509   **Lat.:** 37° 46.81 N   **Long.:** 123° 14.67 W

P(dbar)	T(°C)	S	O <sub>2</sub> ( $\mu\text{m/kg}$ )	Xmiss(%)	$\Delta\Phi$	$\sigma_\theta$	$\pi_\theta$
0	13.397	33.707	330.3	83.7	0.027	25.311	0.759
10	12.105	33.717	310.7	84.3	0.253	25.573	0.509
20	10.690	33.685	220.8	87.0	0.482	25.807	0.220
30	10.148	33.725	181.3	89.3	0.692	25.932	0.156
50	9.413	33.846	136.4	90.4	1.083	26.149	0.127
75	9.053	33.982	101.4	90.3	1.528	26.314	0.176
100	8.882	34.006	84.5	88.8	1.951	26.360	0.167
125	8.818	34.012	80.7	88.4	2.368	26.375	0.161
129	8.811	34.012	80.3	88.3	2.435	26.376	0.160



Station: 4 Date: 7/13/2010, 0724 Lat.: 37° 41.53 N Long.: 123° 25.87 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	13.916	33.647	286.7	83.4	0.028	25.159	0.821
10	12.459	33.629	294.2	83.3	0.273	25.437	0.508
20	10.762	33.602	231.7	87.9	0.513	25.729	0.166
30	10.257	33.647	193.7	89.4	0.733	25.852	0.112
50	9.691	33.760	155.9	90.5	1.142	26.037	0.105
75	9.152	33.859	119.8	90.6	1.612	26.202	0.094
100	8.784	33.958	103.3	90.7	2.049	26.338	0.114
125	8.465	33.993	104.9	90.8	2.461	26.415	0.091
150	8.263	34.027	97.3	90.8	2.859	26.473	0.087
200	7.732	34.055	82.5	90.8	3.622	26.574	0.029
250	7.570	34.152	56.4	90.6	4.339	26.674	0.082
300	7.188	34.144	52.6	90.5	5.029	26.722	0.020
400	6.434	34.208	32.4	90.8	6.317	26.876	-0.032
500	5.813	34.248	23.0	90.9	7.489	26.987	-0.080
600	5.315	34.301	17.2	91.0	8.567	27.090	-0.099
700	4.928	34.353	15.6	90.9	9.569	27.177	-0.103
800	4.561	34.386	15.7	91.1	10.503	27.244	-0.119
900	4.229	34.410	17.3	91.0	11.381	27.300	-0.136
1000	3.929	34.443	20.5	90.9	12.208	27.358	-0.141
1010	3.905	34.445	20.5	91.0	12.288	27.362	-0.142

Station: 5 Date: 7/13/2010, 1038 Lat.: 37° 36.94 N Long.: 123° 36.65 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.138	33.666	290.2	82.2	0.028	25.127	0.883
10	14.106	33.667	289.8	82.3	0.282	25.135	0.876
20	12.218	33.635	279.6	85.2	0.545	25.488	0.465
30	11.207	33.626	246.3	87.1	0.788	25.669	0.266
50	9.425	33.637	172.2	90.2	1.215	25.984	-0.037
75	9.150	33.864	118.1	90.5	1.694	26.206	0.098
100	8.854	33.934	110.0	90.6	2.136	26.308	0.105
125	8.477	33.980	107.9	90.6	2.553	26.403	0.083
150	8.199	34.013	102.5	90.7	2.954	26.471	0.065
200	7.691	34.051	84.4	90.9	3.716	26.576	0.020
250	7.196	34.087	66.5	91.0	4.436	26.675	-0.023
300	6.724	34.097	56.6	91.0	5.120	26.748	-0.080
400	6.270	34.211	31.8	90.8	6.388	26.899	-0.051
500	5.749	34.252	22.7	91.0	7.548	26.998	-0.085
600	5.275	34.310	16.5	91.1	8.621	27.102	-0.096
700	4.702	34.330	15.1	91.2	9.608	27.184	-0.147
800	4.371	34.389	15.7	91.2	10.519	27.268	-0.136
900	4.042	34.435	19.0	91.3	11.363	27.339	-0.136
1000	3.840	34.455	21.6	91.3	12.159	27.377	-0.140
1011	3.810	34.459	22.1	91.3	12.245	27.383	-0.140

Station: 6 Date: 7/13/2010, 1427 Lat.: 37° 27.01 N Long.: 123° 58.08 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	13.333	33.522	293.5	84.9	0.028	25.181	0.600
10	13.001	33.521	292.2	85.2	0.274	25.247	0.531
20	12.285	33.687	291.2	84.5	0.540	25.516	0.520
30	11.454	33.693	264.9	87.5	0.778	25.676	0.365
50	9.521	33.708	170.6	90.3	1.203	26.024	0.036
75	8.520	33.802	140.3	90.6	1.664	26.256	-0.052
100	8.152	33.887	121.8	90.5	2.092	26.378	-0.040
125	7.885	33.921	125.0	90.7	2.499	26.445	-0.054
150	7.633	33.940	118.3	90.8	2.892	26.497	-0.076
200	7.309	34.014	93.6	91.0	3.641	26.602	-0.065
250	7.095	34.073	65.1	91.1	4.352	26.679	-0.048
300	6.654	34.087	55.4	91.1	5.033	26.750	-0.098
400	5.888	34.140	37.6	91.2	6.292	26.892	-0.155
500	5.284	34.192	26.4	91.3	7.447	27.006	-0.188
600	4.923	34.276	17.1	91.3	8.498	27.116	-0.164
700	4.584	34.336	14.5	91.3	9.463	27.201	-0.155
800	4.282	34.386	15.1	91.3	10.360	27.275	-0.148
900	4.002	34.428	17.7	91.3	11.201	27.338	-0.145
1000	3.717	34.461	21.8	91.3	11.990	27.393	-0.148
1013	3.692	34.463	22.4	91.3	12.089	27.398	-0.148

Station: 7 Date: 7/13/2010, 1804 Lat.: 37° 16.85 N Long.: 124° 19.74 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	13.450	33.005	283.3	88.2	0.032	24.758	0.214
10	12.392	33.041	289.6	86.7	0.307	24.994	0.028
20	11.296	33.123	271.9	88.2	0.590	25.262	-0.117
30	10.478	33.158	255.4	89.3	0.851	25.433	-0.238
50	10.044	33.394	233.6	90.0	1.327	25.692	-0.126
75	10.027	33.607	232.4	90.3	1.877	25.861	0.040
100	8.686	33.670	168.7	90.7	2.379	26.128	-0.130
125	8.696	33.896	129.2	90.5	2.832	26.303	0.050
150	8.468	34.006	90.0	90.5	3.247	26.425	0.101
200	8.023	34.093	73.1	90.5	4.026	26.561	0.101
250	7.242	34.070	66.6	90.9	4.756	26.656	-0.030
300	6.779	34.092	54.4	91.0	5.447	26.738	-0.076
400	5.944	34.163	33.9	91.1	6.706	26.903	-0.130
500	5.333	34.233	21.6	91.1	7.839	27.033	-0.150
600	5.010	34.299	16.8	91.1	8.878	27.124	-0.136
700	4.634	34.341	15.1	91.2	9.846	27.200	-0.145
800	4.335	34.379	15.5	91.1	10.751	27.264	-0.148
900	4.018	34.415	16.7	91.2	11.601	27.326	-0.153
1000	3.759	34.443	18.9	91.3	12.403	27.375	-0.157
1014	3.743	34.447	19.4	91.2	12.512	27.380	-0.157

Station: 8 Date: 7/13/2010, 2217 Lat.: 37° 06.86 N Long.: 124° 41.66 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.258	33.016	276.5	88.3	0.033	24.601	0.395
10	13.055	33.172	284.7	87.1	0.314	24.966	0.265
20	11.253	33.205	281.1	88.0	0.597	25.333	-0.060
30	10.611	33.173	260.7	88.8	0.856	25.422	-0.202
50	9.688	33.315	222.9	90.1	1.343	25.689	-0.250
75	9.095	33.539	201.1	90.5	1.882	25.960	-0.169
100	8.658	33.701	147.8	90.7	2.368	26.156	-0.110
125	8.443	33.866	125.0	90.7	2.814	26.318	-0.013
150	7.992	33.895	142.3	90.8	3.233	26.409	-0.059
200	7.040	33.935	134.2	91.1	4.009	26.577	-0.164
250	6.579	33.974	100.7	91.1	4.726	26.671	-0.196
300	6.708	34.115	48.4	91.1	5.402	26.765	-0.068
400	6.069	34.199	29.9	91.1	6.652	26.915	-0.086
500	5.577	34.245	21.7	91.1	7.793	27.014	-0.111
600	5.026	34.290	17.0	91.1	8.845	27.115	-0.141
700	4.656	34.342	14.9	91.1	9.816	27.199	-0.142
800	4.326	34.393	16.0	91.1	10.717	27.275	-0.138
900	4.002	34.431	18.4	91.1	11.556	27.340	-0.142
1000	3.687	34.462	21.4	91.3	12.341	27.398	-0.150
1012	3.661	34.468	23.2	91.3	12.432	27.405	-0.147

Station: 9 Date: 7/14/2010, 0143 Lat.: 36° 56.76 N Long.: 125° 02.98 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	13.201	33.034	282.9	87.1	0.031	24.831	0.186
10	12.970	33.014	283.9	86.9	0.310	24.861	0.122
20	12.159	33.067	284.8	86.7	0.613	25.058	0.003
30	10.563	33.014	272.0	87.0	0.891	25.306	-0.338
50	9.941	33.294	236.7	89.5	1.396	25.631	-0.223
75	9.075	33.525	183.5	90.5	1.941	25.953	-0.184
100	9.008	33.782	176.5	90.5	2.426	26.165	0.009
125	8.532	33.868	139.2	90.5	2.871	26.306	0.002
150	8.165	33.962	99.5	90.6	3.283	26.436	0.020
200	7.753	34.024	83.3	90.7	4.065	26.547	0.008
250	7.322	34.048	74.7	90.9	4.804	26.627	-0.036
300	6.749	34.064	63.1	91.0	5.504	26.719	-0.103
400	5.928	34.119	42.2	91.1	6.798	26.870	-0.166
500	5.620	34.219	25.2	91.2	7.970	26.987	-0.127
600	4.862	34.248	18.3	91.2	9.037	27.100	-0.193
700	4.532	34.316	14.7	91.2	10.014	27.191	-0.176
800	4.310	34.391	15.6	91.2	10.916	27.275	-0.142
900	4.001	34.425	17.4	91.2	11.760	27.336	-0.147
1000	3.773	34.467	23.1	91.2	12.552	27.393	-0.138
1014	3.716	34.467	23.2	91.2	12.658	27.399	-0.143

Station: 10 Date: 7/14/2010, 0509 Lat.: 36° 46.87 N Long.: 125° 24.74 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	13.753	32.536	278.2	88.4	0.036	24.334	-0.097
10	13.738	32.535	277.7	88.7	0.358	24.337	-0.101
20	13.593	32.537	278.8	88.5	0.715	24.368	-0.131
30	13.408	32.549	279.2	88.1	1.070	24.415	-0.160
50	12.673	32.587	277.1	89.3	1.749	24.589	-0.280
75	11.757	32.729	274.1	90.4	2.570	24.872	-0.347
100	11.175	32.840	261.4	90.5	3.323	25.065	-0.368
125	9.698	33.209	205.8	90.7	3.980	25.606	-0.334
150	9.081	33.524	170.7	90.7	4.535	25.952	-0.185
200	8.295	33.903	116.6	90.8	5.462	26.371	-0.008
250	7.832	34.008	94.4	90.9	6.264	26.523	0.005
300	7.247	34.038	76.5	91.0	7.011	26.631	-0.055
400	6.000	34.049	55.3	91.1	8.376	26.806	-0.213
500	5.441	34.127	37.0	91.2	9.609	26.936	-0.221
600	4.965	34.236	20.1	91.3	10.713	27.079	-0.190
700	4.759	34.327	15.0	91.3	11.709	27.176	-0.142
800	4.321	34.370	14.6	91.3	12.630	27.258	-0.157
900	4.068	34.410	16.2	91.3	13.488	27.317	-0.152
1000	3.789	34.448	19.5	91.3	14.297	27.376	-0.151
1012	3.758	34.452	20.3	91.3	14.390	27.382	-0.151

Station: 11 Date: 7/14/2010, 0843 Lat.: 36° 36.81 N Long.: 125° 46.60 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.505	32.551	271.9	89.3	0.037	24.190	0.078
10	14.506	32.550	271.2	89.3	0.372	24.189	0.077
20	14.366	32.546	271.7	89.3	0.744	24.216	0.043
30	13.336	32.551	280.7	89.1	1.100	24.431	-0.173
50	12.582	32.595	279.9	88.5	1.776	24.613	-0.292
75	12.274	32.641	274.9	90.1	2.595	24.708	-0.317
100	11.652	32.708	261.9	90.4	3.387	24.876	-0.384
125	10.124	32.921	237.6	90.7	4.107	25.311	-0.492
150	9.674	33.325	205.8	90.7	4.724	25.701	-0.246
200	8.421	33.759	171.0	90.9	5.737	26.239	-0.103
250	7.684	33.929	139.9	91.0	6.578	26.482	-0.079
300	7.806	34.100	67.6	91.0	7.338	26.600	0.074
400	6.758	34.131	45.3	91.0	8.730	26.772	-0.050
500	5.681	34.160	33.4	91.2	9.977	26.933	-0.166
600	5.091	34.217	21.9	91.2	11.104	27.050	-0.191
700	4.759	34.305	15.1	91.3	12.127	27.158	-0.160
800	4.379	34.356	14.3	91.3	13.065	27.241	-0.162
900	4.120	34.413	16.3	91.3	13.931	27.314	-0.144
1000	3.804	34.441	18.8	91.3	14.743	27.369	-0.155
1100	3.546	34.473	18.4	91.3	15.511	27.421	-0.155
1200	3.334	34.489	21.4	91.3	16.238	27.454	-0.164
1300	3.132	34.514	27.5	91.3	16.933	27.493	-0.163
1400	2.928	34.532	32.6	91.3	17.596	27.527	-0.167
1500	2.695	34.546	36.5	91.3	18.227	27.559	-0.177
1750	2.299	34.582	50.3	91.3	19.688	27.622	-0.183
2000	2.021	34.608	63.3	91.3	21.018	27.667	-0.185
2500	1.759	34.643	83.8	91.3	23.466	27.717	-0.180
3000	1.610	34.665	102.8	91.3	25.775	27.749	-0.177
3500	1.525	34.679	117.2	91.3	28.029	27.770	-0.175
3994	1.491	34.688	130.5	91.3	30.230	27.783	-0.173

Station: 12 Date: 7/14/2010, 1318 Lat.: 36° 36.75 N Long.: 125° 46.43 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.255	32.555	273.6	89.3	0.037	24.245	0.026
10	14.262	32.554	272.8	89.5	0.367	24.244	0.027
20	14.136	32.552	273.2	89.3	0.733	24.268	-0.002
30	12.938	32.551	280.5	88.7	1.085	24.509	-0.255
50	12.429	32.612	274.4	89.5	1.754	24.656	-0.309
75	12.124	32.660	273.8	90.5	2.562	24.751	-0.331
100	11.775	32.691	267.7	90.5	3.356	24.840	-0.375
125	10.116	32.991	232.0	90.7	4.078	25.366	-0.437
150	9.807	33.440	221.0	90.5	4.682	25.769	-0.132
200	8.348	33.793	166.6	90.9	5.670	26.277	-0.087
207	8.246	33.837	160.3	91.0	5.792	26.327	-0.067

Station: 13 Date: 7/14/2010, 1556 Lat.: 36° 19.76 N Long.: 125° 33.25 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	15.613	33.035	263.4	88.8	0.036	24.323	0.711
10	15.120	32.960	263.7	88.5	0.359	24.374	0.540
20	12.324	32.665	280.8	88.0	0.694	24.715	-0.287
30	12.151	32.774	268.5	90.0	1.011	24.833	-0.233
50	10.537	32.755	258.6	90.1	1.606	25.110	-0.551
75	9.987	33.110	224.9	90.7	2.274	25.480	-0.363
100	9.472	33.408	202.4	90.5	2.859	25.798	-0.212
125	9.018	33.576	193.2	90.5	3.387	26.002	-0.153
150	8.921	33.803	150.3	90.5	3.870	26.196	0.011
200	8.565	33.974	105.8	90.7	4.737	26.386	0.090
250	7.865	34.017	93.5	90.9	5.537	26.525	0.017
300	7.389	34.062	74.2	91.0	6.283	26.630	-0.016
400	6.547	34.120	47.3	91.0	7.658	26.792	-0.087
500	6.231	34.238	25.1	91.1	8.910	26.926	-0.036
600	5.289	34.305	16.6	91.1	10.016	27.096	-0.099
700	4.729	34.351	14.8	91.1	10.994	27.197	-0.127
800	4.331	34.385	15.2	91.2	11.901	27.269	-0.144
900	4.003	34.419	17.0	91.2	12.749	27.331	-0.151
1000	3.783	34.457	21.4	91.2	13.543	27.384	-0.144
1015	3.752	34.461	22.2	91.2	13.659	27.390	-0.144

Station: 14 Date: 7/14/2010, 1902 Lat.: 36° 02.39 N Long.: 125° 20.28 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.880	32.926	269.7	89.0	0.035	24.399	0.459
10	14.701	32.916	270.6	89.0	0.351	24.430	0.412
20	13.568	33.001	278.0	88.8	0.684	24.732	0.236
30	13.153	33.118	278.7	89.0	0.994	24.906	0.242
50	10.683	33.069	247.4	90.4	1.561	25.329	-0.273
75	10.118	33.249	226.1	90.7	2.194	25.567	-0.229
100	9.708	33.437	212.8	90.7	2.769	25.782	-0.150
125	9.328	33.636	186.3	90.7	3.297	26.000	-0.055
150	9.004	33.745	161.4	90.6	3.785	26.137	-0.021
200	8.427	33.957	109.0	90.7	4.666	26.394	0.055
250	7.863	34.030	88.5	90.9	5.453	26.535	0.027
300	7.373	34.059	75.5	91.0	6.200	26.630	-0.021
400	6.488	34.146	42.1	91.0	7.553	26.820	-0.074
500	5.662	34.178	30.5	91.1	8.774	26.950	-0.154
600	5.047	34.244	19.4	91.2	9.875	27.076	-0.175
700	4.716	34.324	14.5	91.2	10.874	27.177	-0.150
800	4.367	34.373	14.4	91.2	11.796	27.255	-0.150
900	4.061	34.415	16.6	91.2	12.655	27.321	-0.149
1000	3.872	34.454	20.9	91.3	13.462	27.372	-0.138
1012	3.861	34.459	22.1	91.3	13.556	27.378	-0.135

Station: 15 Date: 7/14/2010, 2219 Lat.: 35° 45.11 N Long.: 125° 07.24 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	16.055	32.986	262.3	89.0	0.037	24.186	0.775
10	15.854	32.993	262.1	88.7	0.370	24.237	0.734
20	15.073	32.900	266.0	88.4	0.733	24.338	0.482
30	15.010	32.908	266.0	88.5	1.090	24.359	0.474
50	13.819	32.841	267.7	89.3	1.789	24.558	0.160
75	11.859	33.018	252.5	90.4	2.567	25.078	-0.096
100	9.945	33.126	229.0	90.7	3.249	25.500	-0.358
125	9.325	33.442	201.4	90.9	3.826	25.849	-0.210
150	9.044	33.673	171.2	90.9	4.340	26.075	-0.072
200	8.447	33.949	122.9	90.9	5.242	26.384	0.052
250	7.939	34.018	100.2	91.0	6.044	26.515	0.029
300	7.042	34.014	96.6	91.0	6.787	26.640	-0.103
400	6.267	34.107	48.2	91.1	8.133	26.817	-0.133
500	5.580	34.166	31.9	91.2	9.350	26.951	-0.173
600	5.126	34.240	20.1	91.2	10.457	27.064	-0.169
700	4.702	34.305	15.3	91.2	11.469	27.164	-0.166
800	4.474	34.379	15.7	91.3	12.399	27.248	-0.134
900	4.280	34.435	18.8	91.2	13.269	27.315	-0.111
1000	3.981	34.463	22.6	91.3	14.086	27.369	-0.120
1018	3.935	34.468	23.5	91.3	14.228	27.377	-0.121

Station: 16 Date: 7/15/2010, 0136 Lat.: 35° 27.31 N Long.: 124° 54.48 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	16.374	32.952	265.0	89.0	0.038	24.088	0.823
10	15.567	32.957	265.9	89.2	0.372	24.274	0.639
20	15.407	32.955	266.6	88.1	0.735	24.307	0.600
30	14.932	32.923	269.2	88.0	1.094	24.387	0.468
50	13.664	32.854	274.0	87.8	1.782	24.599	0.138
75	12.402	33.025	257.6	89.7	2.577	24.981	0.016
100	10.420	33.252	218.3	90.6	3.262	25.518	-0.174
125	9.577	33.484	173.6	90.5	3.840	25.841	-0.135
150	9.457	33.833	123.1	90.6	4.341	26.134	0.122
200	8.771	33.980	97.6	90.8	5.247	26.358	0.127
203	8.740	33.989	95.5	90.8	5.297	26.371	0.129

Station: 17 Date: 7/15/2010, 0307 Lat.: 35° 27.64 N Long.: 124° 53.49 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	16.172	32.954	264.7	89.0	0.038	24.135	0.777
10	15.787	32.959	264.6	88.9	0.373	24.226	0.692
20	15.536	32.961	265.2	88.4	0.739	24.284	0.635
30	15.190	32.948	266.9	88.2	1.100	24.350	0.545
50	13.987	32.898	271.1	87.5	1.794	24.567	0.241
75	12.376	33.046	258.3	89.9	2.586	25.002	0.027
100	10.164	33.300	212.8	90.6	3.253	25.599	-0.181
125	9.347	33.557	166.4	90.5	3.811	25.935	-0.115
150	9.450	33.819	122.6	90.5	4.304	26.123	0.110
200	8.716	33.998	97.1	90.8	5.190	26.382	0.133
250	7.891	34.030	86.8	90.9	5.989	26.531	0.031
300	7.567	34.099	64.9	90.9	6.734	26.633	0.038
400	6.778	34.169	40.6	91.0	8.099	26.799	-0.017
500	5.732	34.181	31.7	91.1	9.329	26.944	-0.143
600	5.248	34.250	20.5	91.2	10.443	27.058	-0.147
700	4.731	34.308	15.5	91.2	11.460	27.163	-0.160
800	4.432	34.372	15.7	91.2	12.391	27.247	-0.144
900	4.148	34.419	18.5	91.3	13.259	27.315	-0.137
1000	3.934	34.458	22.8	91.3	14.072	27.369	-0.129
1100	3.702	34.481	23.0	91.3	14.844	27.412	-0.134
1200	3.438	34.503	27.1	91.3	15.579	27.456	-0.143
1300	3.227	34.526	32.1	91.3	16.276	27.494	-0.145
1400	3.030	34.543	37.2	91.3	16.940	27.526	-0.150
1500	2.847	34.556	41.6	91.3	17.579	27.554	-0.156
1750	2.409	34.584	52.0	91.3	19.070	27.615	-0.172
2000	2.099	34.615	67.8	91.3	20.424	27.667	-0.173
2500	1.807	34.646	87.8	91.3	22.900	27.717	-0.174
3000	1.640	34.665	103.2	91.3	25.232	27.747	-0.174
3500	1.542	34.678	114.6	91.3	27.503	27.767	-0.175
4000	1.499	34.688	128.0	91.3	29.743	27.783	-0.172
4072	1.497	34.689	130.1	91.3	30.067	27.784	-0.172



Station: 18 Date: 7/15/2010, 0700 Lat.: 35° 32.67 N Long.: 124° 43.93 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	16.222	32.847	269.0	88.9	0.039	24.042	0.704
10	14.806	32.825	271.8	88.6	0.370	24.338	0.363
20	14.555	32.835	273.5	88.7	0.724	24.399	0.315
30	14.404	32.842	274.0	88.2	1.074	24.437	0.287
50	13.893	32.837	269.3	87.1	1.769	24.539	0.172
75	12.388	32.988	260.4	90.0	2.553	24.955	-0.017
100	10.348	33.118	228.4	90.6	3.260	25.426	-0.295
125	9.610	33.528	175.3	90.6	3.842	25.869	-0.095
150	8.880	33.714	148.4	90.5	4.342	26.133	-0.066
200	8.551	33.975	105.6	90.8	5.221	26.389	0.088
250	8.102	34.068	77.7	90.9	6.020	26.530	0.093
300	7.512	34.073	73.4	91.0	6.767	26.621	0.010
400	6.533	34.134	43.2	91.0	8.136	26.805	-0.077
500	6.072	34.245	24.4	91.0	9.360	26.952	-0.050
600	5.368	34.276	18.1	91.1	10.477	27.064	-0.113
700	4.848	34.316	15.1	91.1	11.499	27.156	-0.142
800	4.486	34.381	15.6	91.2	12.433	27.249	-0.131
900	4.246	34.437	19.0	91.2	13.299	27.320	-0.113
1000	3.961	34.470	23.5	91.2	14.111	27.376	-0.117
1011	3.941	34.474	24.2	91.2	14.197	27.382	-0.116

Station: 19 Date: 7/15/2010, 1202 Lat.: 35° 27.33 N Long.: 124° 54.09 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	15.896	32.938	264.1	89.7	0.037	24.185	0.700
10	15.837	32.922	264.3	89.5	0.373	24.187	0.674
20	15.303	32.945	266.4	89.3	0.740	24.323	0.570
30	14.907	32.899	268.0	89.0	1.097	24.374	0.444
50	14.228	32.864	269.1	87.9	1.796	24.491	0.266
75	12.390	33.007	265.6	89.8	2.585	24.970	-0.001
100	10.933	33.115	233.9	90.5	3.287	25.322	-0.192
125	9.862	33.408	195.2	90.6	3.892	25.735	-0.147
150	9.132	33.609	164.6	90.5	4.434	26.011	-0.109
200	8.882	33.943	104.7	90.7	5.365	26.313	0.116
250	8.069	33.988	94.1	90.9	6.196	26.473	0.025
300	7.772	34.087	71.2	90.9	6.966	26.594	0.058
400	6.859	34.162	42.1	91.0	8.365	26.783	-0.012
500	5.864	34.168	33.4	91.1	9.619	26.917	-0.137
600	5.206	34.230	21.3	91.2	10.750	27.047	-0.167
700	4.754	34.301	15.4	91.2	11.777	27.155	-0.164
800	4.420	34.360	14.7	91.3	12.717	27.240	-0.154
900	4.169	34.411	17.7	91.3	13.591	27.307	-0.141
1000	3.938	34.457	22.6	91.3	14.409	27.368	-0.129
1014	3.902	34.463	23.9	91.3	14.520	27.376	-0.128

Station: 20 Date: 7/15/2010, 1924 Lat.: 35° 27.75 N Long.: 124° 54.72 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	16.581	32.928	263.9	89.3	0.039	24.022	0.854
10	15.656	32.907	266.4	89.4	0.382	24.216	0.620
20	15.047	32.903	268.9	89.2	0.746	24.346	0.478
30	14.817	32.897	269.8	88.7	1.101	24.391	0.422
50	13.622	32.964	265.5	88.0	1.791	24.693	0.217
75	12.535	33.066	262.5	89.7	2.568	24.988	0.075
100	10.706	33.218	225.9	90.6	3.264	25.442	-0.151
125	9.612	33.475	179.2	90.6	3.855	25.828	-0.136
150	9.362	33.719	142.8	90.5	4.373	26.060	0.016
200	8.684	33.970	102.0	90.8	5.282	26.365	0.106
250	7.767	34.032	85.4	90.9	6.080	26.552	0.015
300	7.444	34.106	62.0	91.0	6.815	26.657	0.027
400	6.632	34.161	39.2	91.0	8.167	26.813	-0.043
500	5.626	34.194	28.3	91.2	9.382	26.967	-0.146
600	5.026	34.255	18.4	91.2	10.468	27.087	-0.169
700	4.679	34.319	14.8	91.3	11.464	27.178	-0.158
800	4.377	34.381	15.7	91.3	12.383	27.261	-0.142
900	4.125	34.422	19.1	91.3	13.239	27.321	-0.137
1000	3.880	34.464	24.1	91.3	14.043	27.379	-0.130
1012	3.855	34.468	24.9	91.3	14.137	27.385	-0.129

Station: 21 Date: 7/16/2010, 0239 Lat.: 35° 27.60 N Long.: 124° 54.16 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	16.760	32.898	262.5	89.2	0.039	23.957	0.872
10	16.089	32.940	263.2	89.1	0.390	24.144	0.747
20	15.421	32.939	267.0	88.7	0.756	24.292	0.591
30	14.847	32.906	271.5	88.7	1.113	24.392	0.436
50	14.222	32.892	277.1	87.5	1.814	24.514	0.287
75	12.474	33.036	256.6	89.8	2.615	24.976	0.038
100	10.600	33.232	224.1	90.6	3.304	25.471	-0.159
125	9.605	33.442	188.5	90.6	3.893	25.804	-0.163
150	9.065	33.662	157.3	90.5	4.414	26.063	-0.077
200	8.638	33.946	111.2	90.7	5.323	26.352	0.079
250	7.980	33.994	99.0	90.9	6.141	26.490	0.016
300	7.674	34.090	69.0	90.9	6.902	26.611	0.046
400	6.745	34.150	43.3	91.0	8.287	26.789	-0.037
500	5.819	34.189	30.9	91.1	9.521	26.940	-0.126
600	5.206	34.239	21.0	91.2	10.645	27.054	-0.161
700	4.772	34.296	15.6	91.3	11.669	27.149	-0.166
800	4.464	34.369	15.3	91.3	12.608	27.242	-0.142
900	4.165	34.415	18.3	91.3	13.481	27.311	-0.138
1000	3.911	34.453	22.5	91.3	14.299	27.368	-0.135
1012	3.879	34.456	23.4	91.3	14.393	27.374	-0.136

Station: 22 Date: 7/16/2010, 0718 Lat.: 35° 27.65 N Long.: 124° 54.54 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	16.500	32.904	263.3	89.3	0.039	24.022	0.815
10	15.594	32.952	266.5	88.7	0.380	24.264	0.641
20	15.006	32.926	270.9	88.3	0.739	24.373	0.487
30	14.619	32.891	271.7	88.7	1.091	24.429	0.374
50	13.107	32.918	273.0	88.3	1.765	24.760	0.072
75	12.083	33.068	253.9	90.2	2.518	25.075	-0.012
100	10.632	33.122	228.7	90.6	3.203	25.380	-0.241
125	9.540	33.449	183.2	90.6	3.794	25.819	-0.169
150	9.327	33.826	131.3	90.6	4.299	26.149	0.095
200	8.559	34.001	99.1	90.9	5.175	26.408	0.111
250	7.788	34.038	87.5	91.0	5.967	26.553	0.023
300	7.432	34.112	59.8	91.0	6.699	26.663	0.029
400	6.419	34.148	39.1	91.0	8.032	26.830	-0.081
500	5.725	34.192	29.0	91.2	9.241	26.954	-0.135
600	5.055	34.248	19.2	91.2	10.338	27.078	-0.171
700	4.666	34.322	15.1	91.3	11.332	27.182	-0.157
800	4.404	34.380	15.7	91.3	12.251	27.257	-0.140
900	4.107	34.425	19.3	91.3	13.107	27.325	-0.136
1000	3.831	34.463	24.1	91.3	13.910	27.384	-0.135
1010	3.839	34.469	24.8	91.3	13.988	27.388	-0.130

Station: 23 Date: 7/16/2010, 1206 Lat.: 35° 27.27 N Long.: 124° 54.92 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	16.282	32.911	263.6	89.2	0.038	24.077	0.769
10	15.955	32.911	264.4	89.3	0.380	24.152	0.692
20	15.734	32.905	264.7	89.2	0.756	24.197	0.636
30	15.017	32.920	269.3	89.1	1.119	24.366	0.485
50	14.240	32.889	273.2	87.9	1.821	24.508	0.288
75	12.500	33.070	265.7	89.3	2.607	24.998	0.071
100	10.794	33.206	228.0	90.6	3.299	25.417	-0.145
125	9.474	33.427	184.5	90.6	3.888	25.813	-0.197
150	9.014	33.557	163.6	90.5	4.413	25.989	-0.169
200	8.846	33.885	118.3	90.7	5.352	26.273	0.064
250	8.377	34.046	84.3	90.9	6.188	26.472	0.118
300	7.785	34.085	70.6	91.0	6.955	26.591	0.059
400	6.915	34.153	45.4	91.0	8.355	26.768	-0.012
500	5.910	34.169	36.8	91.2	9.622	26.912	-0.131
600	5.158	34.226	21.7	91.2	10.758	27.049	-0.176
700	4.744	34.301	15.5	91.3	11.780	27.156	-0.165
800	4.427	34.360	14.8	91.3	12.719	27.238	-0.154
900	4.162	34.408	16.9	91.3	13.596	27.306	-0.144
1000	3.930	34.450	22.2	91.3	14.416	27.364	-0.135
1010	3.946	34.462	23.4	91.3	14.495	27.371	-0.125

Station: 24 Date: 7/16/2010, 1523 Lat.: 35° 37.68 N Long.: 124° 33.63 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	16.103	32.929	263.7	89.0	0.038	24.132	0.742
10	16.063	32.930	263.5	89.3	0.378	24.142	0.733
20	15.005	32.895	270.6	88.2	0.741	24.349	0.462
30	14.409	32.824	275.6	88.3	1.094	24.422	0.274
50	13.738	32.964	269.9	87.0	1.780	24.669	0.241
75	12.064	32.962	263.2	90.0	2.556	24.997	-0.101
100	11.308	33.098	244.7	90.4	3.278	25.242	-0.136
125	9.794	33.470	189.2	90.7	3.883	25.794	-0.109
150	9.387	33.704	146.6	90.7	4.403	26.044	0.008
200	8.692	33.970	103.0	90.7	5.301	26.363	0.106
250	8.131	34.057	82.8	90.9	6.110	26.518	0.089
300	7.678	34.091	67.0	90.9	6.865	26.612	0.048
400	6.628	34.132	45.2	91.0	8.245	26.790	-0.066
500	6.313	34.243	26.7	91.1	9.501	26.920	-0.021
600	5.609	34.272	19.8	91.0	10.646	27.032	-0.087
700	4.889	34.301	15.9	91.2	11.688	27.140	-0.149
800	4.603	34.374	15.3	91.2	12.644	27.230	-0.124
900	4.354	34.426	18.0	91.2	13.526	27.300	-0.110
1000	3.994	34.454	22.1	91.3	14.353	27.360	-0.126
1010	3.958	34.454	22.5	91.3	14.433	27.364	-0.129

Station: 25 Date: 7/16/2010, 1805 Lat.: 35° 42.39 N Long.: 124° 23.01 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	15.846	32.888	265.3	88.9	0.037	24.158	0.649
10	15.807	32.887	264.1	89.0	0.375	24.166	0.639
20	14.693	32.854	271.0	88.6	0.735	24.385	0.361
30	14.429	32.857	271.2	88.2	1.087	24.443	0.305
50	13.402	32.861	270.9	88.4	1.765	24.658	0.088
75	11.939	32.988	261.4	90.1	2.524	25.040	-0.105
100	11.220	33.116	243.9	90.6	3.230	25.271	-0.139
125	9.734	33.439	191.1	90.7	3.853	25.780	-0.144
150	9.448	33.657	155.7	90.7	4.387	25.997	-0.019
200	8.699	33.958	106.1	90.7	5.307	26.353	0.098
250	8.219	34.048	83.9	90.9	6.125	26.497	0.095
300	7.799	34.108	67.3	90.9	6.887	26.608	0.079
400	6.753	34.154	44.0	91.0	8.278	26.791	-0.033
500	6.229	34.248	25.6	91.0	9.522	26.935	-0.028
600	5.469	34.259	20.1	91.0	10.661	27.039	-0.114
700	4.874	34.324	15.4	91.2	11.685	27.160	-0.133
800	4.564	34.372	15.1	91.2	12.631	27.233	-0.130
900	4.290	34.420	17.9	91.3	13.513	27.302	-0.121
1000	3.983	34.449	21.5	91.3	14.339	27.358	-0.131
1012	3.963	34.451	22.0	91.3	14.435	27.361	-0.131

Station: 26 Date: 7/16/2010, 2033 Lat.: 35° 47.25 N Long.: 124° 12.21 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	15.773	32.846	266.0	89.2	0.038	24.142	0.599
10	15.727	32.846	265.1	89.2	0.376	24.153	0.588
20	14.741	32.870	270.7	89.0	0.738	24.386	0.384
30	14.666	32.879	270.0	88.8	1.090	24.410	0.374
50	14.195	32.842	271.0	87.3	1.790	24.481	0.241
75	12.077	33.029	256.0	90.3	2.583	25.046	-0.045
100	10.853	33.185	234.5	90.6	3.280	25.390	-0.151
125	9.850	33.445	191.7	90.7	3.885	25.765	-0.120
150	9.387	33.658	152.7	90.7	4.416	26.008	-0.028
200	8.682	33.938	109.4	90.8	5.334	26.340	0.080
250	8.297	34.074	78.9	91.0	6.151	26.506	0.127
300	7.582	34.089	70.3	91.0	6.907	26.623	0.032
400	6.865	34.191	39.0	91.1	8.282	26.805	0.012
500	6.126	34.223	26.5	91.1	9.516	26.928	-0.061
600	5.299	34.230	21.6	91.2	10.652	27.036	-0.157
700	4.904	34.321	15.4	91.3	11.684	27.154	-0.131
800	4.486	34.362	15.0	91.3	12.623	27.234	-0.146
900	4.276	34.415	17.5	91.3	13.506	27.299	-0.127
1000	3.985	34.450	21.7	91.3	14.334	27.358	-0.129
1011	3.952	34.456	22.1	91.3	14.422	27.366	-0.129

Station: 27 Date: 7/16/2010, 2321 Lat.: 35° 52.23 N Long.: 124° 01.00 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	15.595	32.888	267.7	88.2	0.037	24.214	0.592
10	15.582	32.887	267.9	88.8	0.370	24.216	0.587
20	15.603	33.074	262.5	88.6	0.733	24.356	0.739
30	15.515	33.069	259.9	88.3	1.089	24.372	0.716
50	12.180	32.773	275.7	88.3	1.752	24.827	-0.229
75	11.450	32.858	267.3	89.6	2.505	25.029	-0.302
100	10.682	33.130	230.9	90.7	3.205	25.377	-0.226
125	9.857	33.285	210.2	90.8	3.823	25.639	-0.246
150	8.982	33.590	166.8	90.7	4.370	26.020	-0.148
200	8.725	33.975	105.3	90.8	5.284	26.362	0.116
250	8.280	34.081	76.2	90.9	6.095	26.514	0.131
300	7.399	34.070	74.1	91.0	6.841	26.634	-0.009
400	6.321	34.089	52.4	91.1	8.213	26.796	-0.141
500	5.561	34.165	32.1	91.2	9.436	26.952	-0.176
600	5.106	34.242	19.9	91.2	10.543	27.068	-0.170
700	4.690	34.319	15.0	91.3	11.549	27.177	-0.156
800	4.430	34.375	15.1	91.3	12.475	27.250	-0.142
900	4.161	34.423	18.4	91.3	13.341	27.318	-0.132
1000	3.929	34.459	22.4	91.3	14.154	27.371	-0.128
1012	3.905	34.461	22.8	91.3	14.249	27.375	-0.129

Station: 28 Date: 7/17/2010, 0142 Lat.: 35° 57.47 N Long.: 123° 50.71 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	15.570	32.903	267.4	88.0	0.037	24.231	0.598
10	15.539	32.897	267.4	88.2	0.368	24.234	0.585
20	14.763	32.873	268.6	88.1	0.733	24.384	0.391
30	12.778	32.757	281.3	88.7	1.065	24.700	-0.123
50	11.945	32.737	275.7	89.8	1.697	24.843	-0.304
75	11.197	32.915	258.6	90.4	2.442	25.119	-0.303
100	10.578	33.149	237.6	90.7	3.120	25.410	-0.229
125	9.534	33.334	209.9	90.8	3.728	25.730	-0.262
150	9.107	33.597	184.6	90.8	4.263	26.006	-0.122
200	8.485	33.930	129.8	90.8	5.178	26.363	0.043
250	8.133	34.014	89.2	90.9	5.999	26.483	0.055
300	7.771	34.093	67.3	91.0	6.765	26.600	0.063
400	6.609	34.128	45.7	91.1	8.146	26.789	-0.072
500	5.717	34.167	33.6	91.2	9.389	26.935	-0.156
600	5.178	34.260	19.4	91.3	10.505	27.073	-0.148
700	4.840	34.325	15.3	91.3	11.510	27.165	-0.135
800	4.442	34.383	15.6	91.3	12.436	27.255	-0.134
900	4.181	34.411	16.6	91.3	13.304	27.306	-0.140
1000	3.905	34.450	20.4	91.3	14.123	27.366	-0.138
1011	3.873	34.452	20.9	91.3	14.210	27.371	-0.139

Station: 29 Date: 7/17/2010, 0418 Lat.: 36° 02.58 N Long.: 123° 40.39 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	15.443	32.888	266.7	89.3	0.037	24.248	0.557
10	15.451	32.889	266.9	89.1	0.367	24.247	0.559
20	14.475	32.822	274.2	88.7	0.731	24.406	0.287
30	13.232	32.836	275.9	88.0	1.065	24.672	0.034
50	11.833	32.859	271.2	89.5	1.687	24.959	-0.227
75	11.024	33.060	260.5	90.3	2.397	25.262	-0.219
100	10.258	33.236	226.4	90.6	3.045	25.533	-0.216
125	9.427	33.466	190.4	90.7	3.623	25.851	-0.174
150	8.995	33.663	174.0	90.8	4.131	26.075	-0.088
200	8.109	33.874	139.6	90.9	5.030	26.377	-0.058
250	7.960	34.047	86.0	90.8	5.829	26.535	0.055
300	7.535	34.095	64.2	91.0	6.571	26.635	0.031
400	6.419	34.116	45.8	91.1	7.939	26.805	-0.106
500	5.826	34.187	29.9	91.1	9.172	26.937	-0.127
600	5.356	34.276	18.7	91.1	10.286	27.066	-0.114
700	4.861	34.334	15.2	91.2	11.293	27.169	-0.126
800	4.531	34.380	15.5	91.2	12.222	27.243	-0.127
900	4.146	34.415	17.1	91.2	13.090	27.313	-0.140
1000	3.827	34.459	21.9	91.2	13.898	27.381	-0.139
1012	3.789	34.459	22.1	91.2	13.991	27.385	-0.142

Station: 30 Date: 7/17/2010, 0622 Lat.: 36° 07.66 N Long.: 123° 29.45 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	15.032	32.887	271.2	89.1	0.036	24.336	0.463
10	14.984	32.884	271.2	89.0	0.358	24.345	0.449
20	14.052	32.876	276.6	88.1	0.709	24.536	0.239
30	12.707	32.976	266.5	87.9	1.030	24.884	0.039
50	10.882	33.206	233.8	90.3	1.582	25.401	-0.127
75	9.741	33.378	206.4	90.6	2.185	25.730	-0.191
100	9.021	33.558	177.4	90.6	2.722	25.987	-0.166
125	8.567	33.755	146.8	90.7	3.202	26.212	-0.082
150	8.185	33.847	161.7	90.8	3.639	26.343	-0.068
200	8.072	34.059	87.2	90.8	4.441	26.527	0.082
250	7.484	34.066	68.1	90.8	5.184	26.619	0.001
300	6.927	34.084	57.6	91.0	5.888	26.711	-0.063
400	6.255	34.170	34.5	91.1	7.179	26.869	-0.085
500	5.716	34.250	22.0	91.1	8.350	27.001	-0.090
600	5.055	34.291	17.1	91.2	9.410	27.112	-0.137
700	4.655	34.337	14.8	91.2	10.385	27.194	-0.146
800	4.369	34.391	15.7	91.2	11.293	27.269	-0.135
900	4.115	34.433	18.8	91.1	12.141	27.330	-0.130
1000	3.824	34.459	21.9	91.2	12.940	27.381	-0.139
1010	3.820	34.462	22.4	91.2	13.018	27.384	-0.137

Station: 31 Date: 7/17/2010, 0908 Lat.: 36° 12.66 N Long.: 123° 18.70 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.638	33.558	282.3	86.1	0.030	24.939	0.906
10	14.633	33.559	281.6	86.1	0.301	24.941	0.905
20	12.106	33.644	280.6	86.7	0.568	25.516	0.451
30	10.601	33.494	248.8	89.3	0.805	25.674	0.052
50	10.103	33.675	221.2	90.4	1.247	25.901	0.107
75	8.706	33.659	172.9	90.7	1.743	26.115	-0.136
100	8.785	33.899	115.5	90.5	2.190	26.291	0.067
125	8.517	33.956	101.1	90.6	2.613	26.378	0.069
150	8.240	34.000	92.6	90.6	3.020	26.455	0.061
200	7.840	34.048	77.4	90.8	3.793	26.553	0.039
250	7.263	34.069	67.0	91.0	4.522	26.652	-0.028
300	7.031	34.133	49.4	91.1	5.212	26.735	-0.010
400	6.381	34.214	30.5	91.1	6.486	26.887	-0.034
500	5.550	34.255	21.4	91.2	7.635	27.025	-0.107
600	4.940	34.292	16.6	91.3	8.679	27.126	-0.149
700	4.612	34.347	14.9	91.3	9.641	27.207	-0.143
800	4.359	34.400	16.6	91.3	10.537	27.278	-0.129
900	4.045	34.436	19.4	91.2	11.377	27.340	-0.134
1000	3.703	34.462	22.3	91.3	12.163	27.396	-0.148
1012	3.685	34.465	22.9	91.3	12.254	27.400	-0.148

Station: 32 Date: 7/17/2010, 1119 Lat.: 36° 17.68 N Long.: 123° 07.97 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.307	33.203	275.2	89.5	0.032	24.734	0.554
10	14.316	33.204	273.9	89.5	0.320	24.734	0.556
20	13.055	33.403	285.0	86.3	0.633	25.145	0.449
30	11.762	33.539	269.9	87.2	0.890	25.500	0.301
50	9.971	33.571	224.7	90.3	1.348	25.842	0.003
75	9.131	33.613	187.7	90.7	1.866	26.012	-0.105
100	8.918	33.745	160.9	90.7	2.347	26.150	-0.034
125	8.707	33.915	116.0	90.7	2.793	26.317	0.067
150	8.497	34.019	89.5	90.8	3.208	26.431	0.116
200	7.733	34.035	84.1	90.9	3.982	26.558	0.013
250	7.292	34.083	66.6	91.1	4.713	26.659	-0.012
300	6.912	34.115	54.5	91.1	5.401	26.737	-0.041
400	6.234	34.152	38.1	91.2	6.692	26.857	-0.102
500	5.596	34.222	24.3	91.2	7.869	26.993	-0.127
600	5.033	34.277	17.5	91.3	8.941	27.104	-0.150
700	4.660	34.336	15.0	91.3	9.920	27.193	-0.147
800	4.386	34.393	15.9	91.3	10.826	27.269	-0.132
900	4.098	34.431	18.7	91.3	11.673	27.330	-0.133
1000	3.801	34.467	23.2	91.2	12.466	27.390	-0.134
1012	3.781	34.469	23.7	91.2	12.558	27.394	-0.135

Station: 33 Date: 7/17/2010, 1402 Lat.: 36° 22.68 N Long.: 122° 57.45 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.760	33.423	273.2	89.1	0.031	24.808	0.826
10	14.765	33.423	273.3	89.2	0.313	24.807	0.827
20	14.114	33.404	272.7	89.3	0.625	24.931	0.671
30	12.270	33.422	266.2	89.4	0.905	25.313	0.306
50	10.592	33.618	217.1	88.9	1.386	25.773	0.148
75	9.914	33.774	167.5	90.3	1.907	26.010	0.153
100	9.326	33.823	137.4	90.5	2.396	26.146	0.094
125	8.768	33.915	117.8	90.7	2.840	26.307	0.076
150	8.579	33.989	103.6	90.8	3.263	26.394	0.105
200	8.171	34.078	80.4	90.9	4.057	26.527	0.112
250	7.414	34.089	67.4	91.0	4.793	26.647	0.009
300	6.774	34.112	51.8	91.1	5.480	26.754	-0.062
400	6.092	34.178	32.8	91.2	6.742	26.896	-0.099
500	5.489	34.233	22.8	91.2	7.894	27.015	-0.131
600	4.978	34.286	16.9	91.2	8.948	27.117	-0.150
700	4.681	34.346	15.0	91.2	9.917	27.199	-0.136
800	4.271	34.371	14.6	91.3	10.824	27.264	-0.161
900	3.960	34.415	16.8	91.3	11.670	27.332	-0.159
1000	3.736	34.451	20.4	91.3	12.466	27.384	-0.154
1013	3.724	34.455	21.0	91.3	12.566	27.388	-0.152



Station: 34 Date: 7/17/2010, 1602 Lat.: 36° 27.58 N Long.: 122° 46.88 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.241	33.525	271.4	89.7	0.030	24.997	0.794
10	14.219	33.527	271.1	90.0	0.295	25.004	0.791
20	11.826	33.575	264.3	90.1	0.563	25.515	0.342
30	10.962	33.622	237.4	87.4	0.798	25.710	0.218
50	10.349	33.689	199.0	89.2	1.240	25.870	0.161
75	9.680	33.770	155.9	90.5	1.753	26.046	0.110
100	9.337	33.841	137.4	90.5	2.236	26.158	0.109
125	8.898	33.935	112.1	90.6	2.687	26.302	0.112
150	8.485	34.012	96.5	90.8	3.104	26.427	0.109
200	7.830	34.046	86.0	91.0	3.881	26.552	0.036
250	7.253	34.072	69.9	91.1	4.613	26.656	-0.027
300	6.848	34.093	58.2	91.1	5.301	26.728	-0.067
400	6.181	34.157	39.8	91.1	6.581	26.868	-0.105
500	5.518	34.220	25.3	91.2	7.755	27.001	-0.138
600	5.130	34.302	16.7	91.3	8.812	27.112	-0.120
700	4.676	34.360	15.2	91.3	9.781	27.210	-0.126
800	4.374	34.398	16.3	91.3	10.682	27.274	-0.129
900	4.054	34.439	19.6	91.3	11.525	27.342	-0.130
1000	3.829	34.465	23.0	91.3	12.318	27.385	-0.134
1012	3.797	34.467	23.8	91.3	12.411	27.390	-0.135

Station: 35 Date: 7/17/2010, 1837 Lat.: 36° 32.90 N Long.: 122° 35.95 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	15.147	33.356	285.1	87.4	0.033	24.673	0.860
10	13.983	33.370	296.2	86.0	0.321	24.932	0.616
20	12.136	33.459	268.2	85.8	0.598	25.367	0.310
30	12.104	33.597	249.8	89.6	0.854	25.480	0.413
50	9.811	33.394	196.8	90.3	1.334	25.731	-0.166
75	9.269	33.562	167.3	90.6	1.875	25.951	-0.122
100	9.450	33.813	135.9	90.8	2.367	26.118	0.106
125	9.184	33.951	109.3	90.9	2.821	26.270	0.172
150	8.762	33.982	105.4	91.0	3.250	26.361	0.128
200	8.302	34.085	76.0	90.9	4.053	26.513	0.138
250	7.739	34.116	64.0	91.0	4.805	26.621	0.077
300	6.854	34.085	60.3	91.1	5.510	26.722	-0.072
400	6.140	34.131	41.5	91.2	6.808	26.852	-0.131
500	5.820	34.233	24.9	91.2	7.994	26.974	-0.091
600	5.519	34.326	17.3	90.7	9.083	27.085	-0.056
700	4.831	34.362	15.8	90.8	10.072	27.195	-0.107
800	4.438	34.407	17.3	90.8	10.975	27.274	-0.116
900	4.193	34.428	18.9	90.8	11.830	27.318	-0.125
1000	3.876	34.457	22.0	91.0	12.640	27.375	-0.135
1012	3.847	34.459	22.4	91.0	12.734	27.379	-0.136

Station: 36 Date: 7/17/2010, 2026 Lat.: 36° 37.61 N Long.: 122° 25.15 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.787	33.330	292.2	87.3	0.032	24.731	0.759
10	14.486	33.327	294.1	85.8	0.318	24.792	0.690
20	13.678	33.350	292.2	85.6	0.626	24.979	0.535
30	12.601	33.398	266.6	86.8	0.908	25.231	0.353
50	11.424	33.541	223.4	89.8	1.414	25.564	0.238
75	10.412	33.716	171.3	90.6	1.981	25.881	0.194
100	9.724	33.782	149.6	90.4	2.495	26.049	0.127
125	9.344	33.895	121.4	90.2	2.970	26.200	0.153
150	9.038	33.988	95.2	90.1	3.413	26.322	0.177
200	8.589	34.063	79.5	90.4	4.249	26.452	0.164
250	7.828	34.094	74.0	90.9	5.014	26.591	0.073
300	7.491	34.129	59.0	91.1	5.741	26.668	0.051
400	6.719	34.209	35.6	90.8	7.076	26.839	0.007
500	5.967	34.269	22.5	90.8	8.259	26.984	-0.045
600	5.472	34.302	17.9	90.6	9.351	27.072	-0.080
700	4.962	34.345	15.3	91.2	10.363	27.167	-0.106
800	4.515	34.392	16.3	91.0	11.295	27.254	-0.119
900	4.232	34.426	18.4	91.0	12.166	27.312	-0.123
1000	3.967	34.452	21.1	91.2	12.990	27.361	-0.130
1011	3.959	34.452	21.3	91.2	13.078	27.363	-0.131

Station: 37 Date: 7/17/2010, 2309 Lat.: 36° 42.44 N Long.: 122° 14.56 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	13.818	33.440	283.6	87.0	0.029	25.019	0.636
10	13.602	33.452	285.5	86.2	0.291	25.073	0.601
20	12.665	33.460	276.5	87.2	0.574	25.267	0.415
30	12.065	33.496	261.4	87.2	0.834	25.410	0.326
50	11.027	33.551	221.3	89.5	1.330	25.644	0.174
75	9.774	33.773	158.4	90.2	1.860	26.033	0.129
100	9.386	33.873	132.2	90.4	2.339	26.175	0.143
125	9.090	33.977	97.8	90.3	2.783	26.305	0.177
150	8.873	34.020	88.3	90.3	3.208	26.374	0.176
200	8.489	34.073	78.8	90.4	4.019	26.475	0.157
250	7.839	34.100	72.0	90.8	4.783	26.595	0.080
300	7.435	34.141	56.6	90.8	5.501	26.686	0.053
400	6.716	34.202	36.5	90.8	6.827	26.834	0.001
500	6.056	34.268	23.9	90.7	8.036	26.973	-0.034
600	5.574	34.316	17.4	91.1	9.142	27.071	-0.057
700	5.018	34.355	15.7	90.8	10.160	27.168	-0.092
800	4.499	34.395	16.8	90.6	11.084	27.258	-0.119
900	4.109	34.433	19.8	90.4	11.933	27.331	-0.130
1000	3.853	34.457	22.6	90.5	12.736	27.377	-0.138
1011	3.820	34.460	22.9	90.6	12.821	27.382	-0.139

Station: 38 Date: 7/18/2010, 0314 Lat.: 36° 47.79 N Long.: 121° 50.81 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.633	33.556	324.9	72.0	0.030	24.938	0.903
10	12.291	33.575	288.2	83.8	0.276	25.428	0.433
20	11.716	33.606	264.5	82.4	0.522	25.560	0.346
30	11.220	33.678	233.7	87.5	0.755	25.707	0.310
50	9.947	33.857	156.2	87.7	1.180	26.070	0.226
75	9.367	33.922	112.8	87.5	1.643	26.217	0.179
100	9.005	33.979	94.5	87.9	2.080	26.320	0.165
125	8.779	34.009	88.6	87.9	2.503	26.379	0.152
150	8.600	34.032	83.2	88.2	2.914	26.425	0.142
200	7.601	34.133	57.8	86.9	3.674	26.654	0.072
224	7.482	34.144	53.9	85.9	4.012	26.680	0.063

Station: 39 Date: 7/18/2010, 0512 Lat.: 36° 43.54 N Long.: 122° 00.48 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.099	33.617	322.3	79.8	0.029	25.098	0.836
10	13.908	33.630	323.9	80.5	0.285	25.148	0.805
20	12.419	33.682	284.8	87.1	0.544	25.486	0.542
30	10.922	33.692	220.7	89.0	0.778	25.772	0.266
50	10.100	33.724	180.2	89.7	1.209	25.940	0.146
75	9.442	33.843	131.0	89.9	1.693	26.143	0.129
100	9.316	33.903	114.4	89.3	2.155	26.210	0.155
125	8.950	33.961	98.5	90.1	2.597	26.314	0.141
150	8.652	34.013	89.8	90.2	3.020	26.402	0.135
200	8.242	34.072	78.5	90.5	3.817	26.512	0.118
250	7.630	34.124	63.4	90.6	4.564	26.643	0.068
300	7.365	34.148	53.9	90.7	5.261	26.701	0.048
400	6.808	34.204	37.1	90.7	6.592	26.823	0.015
500	6.396	34.235	29.0	90.8	7.835	26.903	-0.017
600	5.661	34.286	21.7	89.8	9.002	27.037	-0.070
700	5.019	34.345	18.7	88.7	10.020	27.161	-0.099
800	4.517	34.392	19.1	88.1	10.946	27.254	-0.119
900	4.206	34.422	21.7	87.5	11.813	27.312	-0.129
1000	3.891	34.451	25.2	86.2	12.636	27.368	-0.139
1011	3.873	34.452	25.5	86.1	12.723	27.371	-0.139

Station: 40 Date: 7/18/2010, 1214 Lat.: 36° 42.34 N Long.: 122° 01.62 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.114	33.583	296.5	82.2	0.029	25.068	0.812
10	13.791	33.638	313.9	83.4	0.287	25.178	0.787
20	12.086	33.662	273.7	85.9	0.546	25.534	0.461
30	10.815	33.652	211.7	89.2	0.780	25.759	0.215
50	10.090	33.722	177.4	90.1	1.207	25.940	0.143
75	9.417	33.823	133.4	90.4	1.697	26.131	0.109
100	9.174	33.887	113.1	89.8	2.160	26.221	0.120
125	9.050	33.922	103.4	89.7	2.605	26.268	0.126
150	8.849	33.993	90.0	90.0	3.039	26.356	0.150
200	8.369	34.063	77.9	90.4	3.857	26.485	0.130
250	7.784	34.113	67.0	90.7	4.615	26.613	0.082
300	7.285	34.159	51.0	90.8	5.319	26.721	0.046
400	6.622	34.220	32.5	90.8	6.609	26.861	0.002
500	5.999	34.259	23.8	90.8	7.804	26.973	-0.048
600	5.199	34.328	18.9	89.3	8.875	27.125	-0.091
700	4.718	34.372	16.9	90.2	9.837	27.216	-0.112
800	4.364	34.406	18.8	89.6	10.733	27.282	-0.124
900	4.140	34.429	20.8	89.3	11.578	27.324	-0.130
1000	3.822	34.458	24.0	89.4	12.386	27.381	-0.140
1011	3.792	34.461	24.2	89.7	12.471	27.386	-0.140

Station: 41 Date: 7/18/2010, 1612 Lat.: 36° 44.31 N Long.: 122° 00.94 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.497	33.639	357.5	80.0	0.029	25.031	0.939
10	13.494	33.657	338.3	68.7	0.285	25.253	0.740
20	11.833	33.663	261.5	85.0	0.540	25.582	0.413
30	10.531	33.657	206.9	89.0	0.767	25.813	0.168
50	10.003	33.770	168.9	90.0	1.187	25.992	0.166
75	9.526	33.840	134.4	89.7	1.676	26.126	0.140
100	9.195	33.937	104.8	89.0	2.130	26.256	0.163
125	9.052	33.950	98.7	89.8	2.570	26.290	0.150
150	8.849	33.983	92.3	90.0	3.000	26.348	0.142
200	8.211	34.075	78.8	90.6	3.806	26.519	0.116
250	7.562	34.139	60.4	90.8	4.545	26.665	0.070
300	7.282	34.158	51.5	90.7	5.236	26.720	0.044
400	6.724	34.211	35.5	90.8	6.538	26.839	0.008
500	6.190	34.247	26.3	90.8	7.758	26.939	-0.034
600	5.290	34.320	20.9	88.5	8.862	27.108	-0.087
700	4.822	34.361	16.9	90.4	9.839	27.195	-0.109
800	4.419	34.401	18.8	89.3	10.741	27.272	-0.122
900	4.152	34.426	21.9	87.6	11.595	27.321	-0.131
1000	3.880	34.452	25.3	87.0	12.407	27.370	-0.139
1011	3.862	34.453	25.6	86.6	12.493	27.373	-0.140

Station: 42 Date: 7/18/2010, 2001 Lat.: 36° 37.47 N Long.: 122° 01.88 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.113	33.585	295.9	80.4	0.029	25.070	0.814
10	12.695	33.659	300.1	85.4	0.276	25.415	0.579
20	11.458	33.646	243.9	87.1	0.521	25.639	0.329
30	10.428	33.633	199.1	89.7	0.744	25.813	0.132
50	9.766	33.744	160.0	90.5	1.162	26.011	0.105
75	9.506	33.864	133.2	90.2	1.643	26.149	0.156
100	9.351	33.910	115.3	89.9	2.105	26.210	0.167
125	8.798	33.934	111.5	90.8	2.547	26.317	0.096
150	8.657	34.012	90.5	90.6	2.969	26.401	0.135
200	8.315	34.078	78.6	90.6	3.763	26.506	0.134
250	7.673	34.090	68.9	91.2	4.517	26.610	0.047
300	7.370	34.139	55.9	90.8	5.231	26.693	0.042
304	7.366	34.141	55.1	90.9	5.287	26.695	0.043

Station: 43 Date: 7/18/2010, 2343 Lat.: 36° 44.48 N Long.: 122° 01.30 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	13.376	33.729	338.6	72.6	0.026	25.333	0.773
10	13.372	33.729	340.4	71.6	0.263	25.334	0.772
20	13.135	33.720	319.0	78.1	0.525	25.375	0.715
30	12.545	33.700	288.2	85.1	0.779	25.476	0.580
50	10.248	33.686	190.0	89.7	1.231	25.885	0.142
75	9.697	33.781	150.8	90.3	1.739	26.052	0.123
100	9.372	33.884	117.2	89.1	2.213	26.186	0.149
125	9.054	33.954	98.4	89.4	2.660	26.293	0.153
150	8.918	33.986	91.0	89.9	3.089	26.339	0.156
200	8.491	34.050	82.2	90.4	3.917	26.457	0.138
250	7.654	34.131	62.4	90.9	4.667	26.646	0.077
300	7.175	34.164	49.2	90.8	5.358	26.740	0.034
400	6.580	34.220	32.8	90.8	6.644	26.866	-0.003
500	6.136	34.249	25.9	90.8	7.848	26.947	-0.039
600	5.300	34.319	20.0	89.0	8.921	27.106	-0.087
700	4.738	34.370	16.7	90.3	9.893	27.211	-0.111
800	4.381	34.405	19.2	88.9	10.791	27.279	-0.123
900	4.173	34.423	22.5	85.7	11.644	27.317	-0.131
1000	3.803	34.459	26.9	82.9	12.443	27.383	-0.141
1012	3.816	34.457	26.8	82.4	12.536	27.381	-0.141

Station: 44 Date: 7/19/2010, 0410 Lat.: 36° 45.98 N Long.: 122° 07.52 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	12.903	33.534	282.2	85.6	0.027	25.276	0.522
10	12.910	33.532	282.1	85.9	0.269	25.274	0.522
20	12.109	33.504	264.0	86.7	0.533	25.407	0.340
30	11.619	33.514	248.4	87.5	0.785	25.507	0.255
50	9.979	33.517	202.2	90.4	1.250	25.798	-0.040
75	9.564	33.742	154.8	90.8	1.758	26.044	0.069
100	9.308	33.836	129.2	90.8	2.237	26.159	0.101
125	9.154	33.918	112.1	90.6	2.692	26.249	0.140
150	8.917	34.008	90.2	90.3	3.125	26.357	0.173
200	8.306	34.064	81.1	90.7	3.946	26.496	0.122
250	7.674	34.104	69.2	90.9	4.694	26.621	0.058
300	7.199	34.102	61.5	91.3	5.401	26.687	-0.012
400	6.860	34.183	41.0	91.0	6.731	26.799	0.005
500	6.205	34.244	27.2	91.0	7.983	26.935	-0.034
600	5.426	34.306	18.5	90.7	9.098	27.081	-0.082
700	4.972	34.347	16.5	90.6	10.108	27.168	-0.103
800	4.484	34.396	17.4	90.3	11.033	27.261	-0.119
900	4.184	34.425	19.5	89.3	11.899	27.316	-0.129
1000	3.928	34.449	22.3	89.2	12.716	27.363	-0.136
1011	3.895	34.452	22.8	89.0	12.803	27.369	-0.138

Station: 45 Date: 7/19/2010, 0547 Lat.: 36° 41.59 N Long.: 122° 07.25 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	13.080	33.469	281.1	85.4	0.028	25.191	0.506
10	13.058	33.470	279.9	85.4	0.277	25.196	0.502
20	12.116	33.483	269.1	86.9	0.548	25.389	0.325
30	11.407	33.540	242.3	88.2	0.796	25.566	0.235
50	10.539	33.708	177.5	90.7	1.250	25.852	0.210
75	9.752	33.787	154.8	90.5	1.760	26.048	0.136
100	9.413	33.880	124.1	90.5	2.232	26.177	0.153
125	9.223	33.964	103.8	90.8	2.677	26.273	0.188
150	9.079	33.978	96.7	90.4	3.114	26.308	0.176
200	8.102	34.088	76.2	90.8	3.921	26.546	0.110
250	7.720	34.132	62.6	90.8	4.654	26.637	0.087
300	7.272	34.144	54.3	91.0	5.355	26.710	0.032
400	6.918	34.198	39.1	90.9	6.684	26.803	0.024
500	6.282	34.251	26.4	91.1	7.928	26.930	-0.019
600	5.541	34.297	19.2	90.8	9.048	27.060	-0.075
700	4.920	34.352	16.2	90.9	10.054	27.177	-0.105
800	4.511	34.394	16.9	90.8	10.989	27.256	-0.118
900	4.171	34.426	18.9	91.1	11.853	27.319	-0.129
1000	3.893	34.453	21.7	91.1	12.663	27.370	-0.137
1010	3.864	34.455	21.9	91.1	12.742	27.374	-0.138

Station: 46 Date: 7/19/2010, 0706 Lat.: 36° 38.12 N Long.: 122° 04.26 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	12.867	33.649	296.4	78.7	0.026	25.373	0.606
10	12.861	33.648	295.3	78.7	0.259	25.373	0.603
20	11.752	33.528	253.9	85.6	0.516	25.493	0.291
30	10.743	33.582	217.4	90.0	0.748	25.717	0.147
50	9.651	33.623	176.9	90.7	1.178	25.936	-0.011
75	9.502	33.829	137.6	90.5	1.669	26.122	0.128
100	9.204	33.932	111.7	90.4	2.131	26.251	0.160
125	9.118	34.049	86.9	90.9	2.563	26.357	0.238
150	8.663	34.060	85.6	91.0	2.973	26.438	0.174
200	8.217	34.084	77.6	90.8	3.758	26.525	0.124
250	7.732	34.122	65.3	90.9	4.503	26.627	0.081
300	7.392	34.155	53.4	90.9	5.210	26.702	0.058
400	6.750	34.167	42.2	91.3	6.545	26.801	-0.023
500	6.367	34.232	29.2	91.0	7.804	26.905	-0.023
600	5.390	34.308	18.1	90.9	8.925	27.087	-0.085
700	4.816	34.364	16.0	91.0	9.908	27.198	-0.107
800	4.422	34.404	17.7	90.5	10.809	27.274	-0.120
900	4.100	34.435	20.0	90.4	11.656	27.334	-0.129
1000	3.855	34.456	23.4	89.9	12.455	27.376	-0.138
1015	3.814	34.461	23.4	90.2	12.572	27.384	-0.139

Station: 47 Date: 7/19/2010, 0831 Lat.: 36° 34.16 N Long.: 122° 02.64 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.261	33.588	309.4	77.9	0.029	25.041	0.848
10	12.199	33.665	277.9	86.3	0.277	25.515	0.486
20	10.551	33.574	216.5	88.7	0.511	25.744	0.106
30	10.253	33.644	193.4	89.8	0.729	25.851	0.110
50	9.598	33.785	150.9	90.7	1.136	26.071	0.109
75	9.271	33.875	122.3	90.6	1.601	26.195	0.126
100	8.985	33.947	103.9	90.4	2.048	26.297	0.136
125	8.832	34.024	88.3	90.6	2.473	26.382	0.172
150	8.674	34.047	83.7	90.6	2.883	26.425	0.166
200	8.077	34.091	76.2	90.8	3.666	26.551	0.108
250	7.596	34.117	64.4	90.9	4.403	26.643	0.058
300	7.342	34.153	53.2	90.9	5.106	26.708	0.049
400	6.821	34.200	38.0	91.0	6.438	26.818	0.013
500	5.899	34.264	23.5	91.0	7.646	26.989	-0.057
600	5.102	34.339	16.7	90.9	8.701	27.145	-0.094
700	4.677	34.377	16.3	90.8	9.641	27.224	-0.113
800	4.478	34.397	17.5	90.1	10.539	27.263	-0.119
814	4.418	34.403	17.8	90.0	10.662	27.274	-0.120

Station: 48 Date: 7/19/2010, 1603 Lat.: 36° 44.48 N Long.: 122° 01.37 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	13.112	33.727	326.3	71.5	0.026	25.385	0.717
10	12.531	33.733	288.3	86.0	0.254	25.504	0.605
20	11.072	33.713	231.6	87.7	0.492	25.761	0.311
30	10.314	33.711	191.4	89.6	0.706	25.893	0.174
50	9.912	33.740	167.1	90.0	1.115	25.984	0.127
75	9.540	33.868	127.8	89.1	1.599	26.146	0.165
100	9.121	33.937	101.5	89.5	2.053	26.268	0.151
125	8.932	33.981	92.8	89.9	2.486	26.333	0.154
150	8.835	33.998	88.6	90.1	2.910	26.362	0.152
200	8.171	34.075	77.3	90.7	3.722	26.525	0.110
202	8.158	34.078	75.1	90.8	3.753	26.529	0.110

Station: 49 Date: 7/19/2010, 1910 Lat.: 36° 43.19 N Long.: 122° 00.58 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	13.204	33.728	336.0	72.9	0.026	25.367	0.737
10	12.722	33.732	305.0	77.4	0.256	25.466	0.642
20	11.852	33.716	256.4	82.6	0.501	25.621	0.459
30	11.017	33.705	217.5	87.3	0.727	25.765	0.294
50	9.628	33.796	145.5	90.3	1.136	26.075	0.123
75	9.305	33.893	112.2	89.1	1.601	26.204	0.146
100	9.028	33.952	97.8	89.9	2.046	26.294	0.147
125	8.826	34.000	87.5	90.2	2.472	26.365	0.153
150	8.516	34.050	79.3	90.5	2.882	26.452	0.143
200	7.785	34.091	70.3	91.1	3.641	26.595	0.065
250	7.613	34.127	61.0	91.0	4.360	26.648	0.068
300	7.402	34.151	53.2	91.0	5.059	26.698	0.056
400	6.782	34.205	36.4	90.9	6.389	26.827	0.012
500	6.167	34.246	27.2	90.2	7.613	26.941	-0.038
600	5.277	34.320	18.9	89.9	8.703	27.110	-0.089
700	4.843	34.359	16.9	90.4	9.685	27.192	-0.108
800	4.537	34.389	17.5	90.0	10.602	27.250	-0.119
900	4.283	34.414	20.1	89.0	11.477	27.298	-0.127
1000	3.893	34.450	24.7	87.5	12.302	27.367	-0.139
1010	3.868	34.452	25.3	87.4	12.381	27.372	-0.140



Station: 50 Date: 7/19/2010, 2308 Lat.: 36° 44.51 N Long.: 122° 01.30 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	12.610	33.607	309.0	72.2	0.026	25.390	0.521
10	12.513	33.611	306.4	72.6	0.258	25.413	0.505
20	12.264	33.668	282.7	80.4	0.509	25.505	0.500
30	11.940	33.720	265.9	78.5	0.753	25.607	0.479
50	10.628	33.725	198.0	89.5	1.198	25.849	0.239
75	9.759	33.758	160.4	90.3	1.715	26.024	0.115
100	9.367	33.895	114.4	89.3	2.194	26.196	0.157
125	9.042	33.960	95.6	89.9	2.636	26.299	0.156
150	8.709	34.014	84.4	90.6	3.061	26.394	0.145
200	7.917	34.096	71.7	90.9	3.842	26.579	0.088
250	7.495	34.133	58.6	90.9	4.563	26.670	0.056
300	7.160	34.168	48.1	91.1	5.251	26.745	0.035
400	6.619	34.216	33.7	91.0	6.539	26.858	-0.001
500	6.159	34.248	26.2	91.1	7.749	26.944	-0.037
600	5.221	34.326	19.8	88.9	8.843	27.121	-0.090
700	4.823	34.362	20.0	87.7	9.820	27.196	-0.108
800	4.507	34.392	19.9	88.0	10.744	27.256	-0.119
900	4.289	34.413	20.8	87.6	11.615	27.296	-0.127
1000	4.023	34.438	24.2	85.7	12.457	27.344	-0.136
1013	4.011	34.439	24.5	84.8	12.563	27.347	-0.136

Station: 51 Date: 7/20/2010, 0235 Lat.: 36° 38.81 N Long.: 121° 59.24 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	13.653	33.680	365.0	64.8	0.027	25.239	0.791
10	13.626	33.682	362.1	65.6	0.272	25.246	0.787
20	11.976	33.669	263.6	83.1	0.528	25.560	0.445
30	11.141	33.734	232.7	87.5	0.762	25.765	0.340
50	10.638	33.791	198.3	89.7	1.200	25.899	0.293
75	9.590	33.860	137.3	89.9	1.698	26.131	0.167
87	9.335	33.895	117.8	90.0	1.920	26.201	0.152

Station: 52 Date: 7/20/2010, 0705 Lat.: 36° 34.61 N Long.: 122° 00.72 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	13.682	33.666	347.1	72.3	0.027	25.222	0.786
10	12.931	33.643	300.7	80.1	0.270	25.356	0.614
20	10.677	33.765	196.5	88.4	0.495	25.871	0.280
30	10.046	33.830	160.2	89.8	0.699	26.031	0.221
50	9.236	33.924	108.6	90.2	1.069	26.239	0.160
75	8.979	33.973	95.8	90.5	1.504	26.318	0.156
100	8.846	34.000	88.1	90.4	1.926	26.361	0.157
125	8.584	34.039	81.9	90.4	2.340	26.432	0.145
150	8.365	34.069	74.1	90.5	2.735	26.490	0.135
200	7.982	34.106	65.9	90.6	3.496	26.577	0.106
250	7.698	34.134	59.2	90.7	4.224	26.642	0.086
300	7.522	34.152	53.3	90.7	4.930	26.682	0.074
358	7.019	34.192	40.8	90.7	5.712	26.784	0.034

Station: 53 Date: 7/20/2010, 1206 Lat.: 36° 29.70 N Long.: 122° 02.20 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	13.662	33.623	292.1	82.9	0.028	25.193	0.749
10	11.458	33.674	243.6	85.2	0.261	25.660	0.351
20	10.287	33.782	179.8	89.6	0.477	25.952	0.225
30	9.825	33.846	145.8	89.9	0.675	26.081	0.196
50	9.194	33.899	112.9	90.3	1.047	26.226	0.133
75	8.927	33.965	102.2	90.6	1.484	26.321	0.142
100	8.729	34.024	87.8	90.7	1.902	26.398	0.157
125	8.580	34.039	81.5	90.6	2.309	26.434	0.145
150	8.441	34.055	81.7	90.9	2.708	26.468	0.136
200	7.941	34.109	67.7	90.9	3.470	26.586	0.102
250	7.492	34.149	55.1	90.8	4.185	26.683	0.068
300	7.217	34.176	45.9	90.9	4.868	26.744	0.050
400	6.695	34.211	34.8	90.8	6.162	26.843	0.005
500	6.019	34.264	23.6	90.7	7.370	26.974	-0.042
512	5.919	34.271	22.0	90.3	7.507	26.993	-0.049

Station: 54 Date: 7/20/2010, 1512 Lat.: 36° 44.66 N Long.: 122° 01.48 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	12.375	33.656	284.6	86.3	0.025	25.474	0.513
10	12.387	33.668	287.1	84.0	0.250	25.481	0.525
20	12.355	33.699	288.2	82.9	0.497	25.511	0.543
30	11.697	33.599	256.3	87.1	0.743	25.559	0.337
50	9.832	33.666	173.2	90.7	1.186	25.940	0.055
75	9.320	33.846	124.6	90.2	1.674	26.164	0.111
100	9.157	33.942	99.3	89.6	2.126	26.266	0.160
125	9.034	33.962	92.3	90.0	2.564	26.302	0.156
150	8.645	34.023	84.5	90.5	2.984	26.411	0.142
200	8.033	34.089	71.6	90.8	3.765	26.556	0.100
203	8.015	34.090	71.2	90.8	3.810	26.560	0.098

Station: 55 Date: 7/20/2010, 1908 Lat.: 36° 43.07 N Long.: 122° 00.40 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	12.465	33.663	293.7	82.6	0.025	25.462	0.536
10	12.383	33.708	291.9	85.5	0.249	25.513	0.556
20	10.737	33.576	225.7	88.8	0.489	25.714	0.141
30	10.166	33.623	192.9	90.4	0.710	25.849	0.078
50	9.589	33.799	148.5	89.9	1.116	26.084	0.119
75	9.342	33.906	113.9	89.4	1.580	26.208	0.162
100	9.013	33.960	94.8	90.0	2.024	26.303	0.151
125	8.685	34.022	85.6	90.6	2.445	26.404	0.148
150	8.535	34.051	78.5	90.6	2.847	26.450	0.147
200	8.037	34.094	73.5	91.0	3.630	26.560	0.105
203	8.038	34.096	72.4	91.0	3.675	26.561	0.106

Station: 56 Date: 7/21/2010, 0235 Lat.: 36° 40.12 N Long.: 121° 59.52 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	12.970	33.711	340.6	67.5	0.026	25.401	0.676
10	12.794	33.687	332.1	69.2	0.256	25.417	0.621
20	12.328	33.660	296.8	75.3	0.509	25.486	0.507
30	10.759	33.695	214.9	88.2	0.744	25.803	0.240
50	9.994	33.739	167.8	90.2	1.166	25.969	0.140
75	9.452	33.879	123.7	89.7	1.647	26.169	0.159
100	8.775	33.998	85.6	90.0	2.088	26.371	0.144
103	8.749	34.004	83.3	89.9	2.137	26.379	0.144

**Table A3:** Results of nutrient and primary productivity analyses of water samples collected at each hydrographic station during the PaCOOS cruise of July 2010. Stations are in chronological (and numerical) order. The time listed (<Mon. dd, yyyy hh:mm> UT) for each station is the beginning of the CTD cast. 12 Niskin bottles were tripped at most stations. The data for each station are separated into up to three sections (“Physical and Chemical,” “Biological,” and “Integrated Values”).

The physical oceanographic properties listed in the first seven columns of the “Physical and Chemical” section of each station’s data are the uncorrected values measured by the CTD at the times each Niskin bottle was tripped. Because they are uncorrected, these values may differ slightly from those listed in Table A2. The last four columns of this section give the nitrate (NO<sub>3</sub>), nitrite (NO<sub>2</sub>), phosphate (PO<sub>4</sub>), and dissolved silicate (SiO<sub>4</sub>) concentrations.

When included, the “Biological” section of each station’s data gives the results of the nutrient and primary productivity analyses, while the “Integrated Values” section sums the nutrient and primary productivity results over the water column to the depth at which light intensity reaches 1% of its surface value.

**Date GMT:** Jul 13, 2010 1:20      **Cruise:** S310      **Latitude:** 37.948      **Year:** 2010  
**Project:** PACOOS      **Station:** 60-50      **Longitude:** -122.883      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 1      **Secchi Depth:** 3      **Day Of Year:** 194

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

#### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.0	6	13.869	33.540	25.086	51	0.497	0.150	1.331	10.042
5	6.6	5	13.389	33.568	25.206	58	8.325	0.396	1.385	17.289
10	11.1	4	12.069	33.738	25.596	79	18.596	0.604	1.718	27.320
20	21.0	3	10.332	33.818	25.973	88	25.892	0.696	2.740	30.771
30	31.3	2	9.693	33.873	26.123	87	30.653	0.673	2.946	38.942
40	41.9	1	9.410	33.939	26.221	77	---	---	---	---

#### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	6	22.812	7.155	0	100	710.386	31.141	0
5	5	17.640	4.749	0	50	1342.292	58.841	1
10	4	5.726	1.938	0	30	647.674	28.392	2
20	3	1.071	1.702	5	15	520.760	29.521	4
30	2	0.526	1.738	5	5	258.891	14.676	6
				10	1	16.462	2.875	11
				10	0.1	27.422	4.789	20

#### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 182.36 mg m-2      Carbon Fixation: 4932.7 mg m-2  
Phaeophytin: 53.20 mg m-2      Productivity Index: 27.05

\* Abbreviations: **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll *a*, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 13, 2010 03:14      **Cruise:** S310      **Latitude:** 37.864      **Year:** 2010  
**Project:** PACOOS      **Station:** 60-52.5      **Longitude:** -123.060      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 2      **Secchi Depth:** 3      **Day Of Year:** 194

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.4	10	13.194	33.776	25.406	57	3.845	0.276	1.121	18.808
5	5.7	8	11.871	33.823	25.700	72	14.531	0.405	1.655	22.577
5	5.5	9	11.758	33.829	25.725	77	---	---	---	---
10	9.6	7	11.021	33.869	25.891	85	20.672	0.396	1.892	24.245
20	18.8	6	10.313	33.864	26.012	85	19.929	0.338	1.858	22.985
30	31.1	5	9.992	33.891	26.087	87	---	---	---	---
40	41.4	4	9.653	33.902	26.153	89	26.810	0.413	2.282	33.191
60	60.6	3	9.086	33.944	26.278	89	30.408	0.416	2.483	43.278
80	81.0	2	8.754	33.995	26.370	85	30.492	0.393	2.991	56.344
85	84.0	1	8.757	33.998	26.372	85	30.188	0.339	2.688	55.018

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	10	13.299	2.546	0	100	948.114	71.290	0
5	8	6.179	1.925	0	50	1026.950	77.218	2
10	7	2.152	0.983	0	30	772.574	58.091	3
20	6	1.995	0.916	5	15	257.465	41.670	6
30	5	1.071	0.556	5	5	133.435	21.596	10
40	4	0.554	0.471	10	1	6.998	3.252	18
60	3	0.174	0.586	10	0.1	0.593	0.275	32
80	2	0.120	1.585					
85	1	0.222	1.483					

### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 127.76 mg m-2      Carbon Fixation: 5796.7 mg m-2  
 Phaeophytin: 33.89 mg m-2      Productivity Index: 45.37

\* **Abbreviations:** *DEP* Depth, *PRESS* Pressure, *BTL* Bottle, *TEMP* Temperature, *SAL* Salinity, *TRANSMISS* Transmissivity, *S.I.* Surface Intensity, *CHL* Chlorophyll *a*, *PHAEO* Phaeophytin, *PROD INDEX* Productivity Index

**Date GMT:** Jul 13, 2010 05:09      **Cruise:** S310      **Latitude:** 37.780      **Year:** 2010  
**Project:** PACOOS      **Station:** 60-55      **Longitude:** -123.244      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 3      **Secchi Depth:** 5      **Day Of Year:** 194

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.6	10	13.302	33.705	25.329	83	4.963	0.181	0.838	8.601
5	6.0	9	12.405	33.720	25.518	84	6.174	0.207	0.960	10.011
10	10.2	8	12.182	33.714	25.556	84	13.380	0.362	1.303	16.130
20	19.4	7	10.523	33.683	25.834	88	22.317	0.479	1.972	24.010
30	30.2	6	10.083	33.747	25.960	90	24.316	0.537	1.464	26.722
40	41.6	5	9.456	33.774	26.085	90	26.795	0.131	2.151	28.690
60	61.1	4	9.211	33.905	26.227	90	28.811	0.199	2.170	33.832
80	80.2	3	9.026	33.989	26.322	90	29.718	0.132	2.383	36.969
100	101.0	2	8.875	34.006	26.360	89	30.126	0.254	2.606	41.781
125	127.9	1	8.816	34.010	26.372	88	30.867	0.235	2.488	42.930

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	10	1.256	0.518	0	100	131.244	104.489	0
5	9	1.459	0.754	0	50	137.328	109.332	4
10	8	1.136	0.560	5	30	93.537	64.100	7
20	7	0.748	0.414	5	15	55.356	37.935	12
30	6	0.377	0.245	10	5	32.439	28.555	20
40	5	0.036	0.027	10	1	8.019	7.059	36
60	4	0.074	0.333	20	0.1	0.399	0.533	68
80	3	0.041	0.455					
100	2	0.065	1.201					
125	1	0.065	1.382					

### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 44.32 mg m-2      Carbon Fixation: 1937.4 mg m-2  
 Phaeophytin: 21.61 mg m-2      Productivity Index: 43.71

\* **Abbreviations:** *DEP* Depth, *PRESS* Pressure, *BTL* Bottle, *TEMP* Temperature, *SAL* Salinity, *TRANSMISS* Transmissivity, *S.I.* Surface Intensity, *CHL* Chlorophyll *a*, *PHAEO* Phaeophytin, *PROD INDEX* Productivity Index

**Date GMT:** Jul 13, 2010 07:24      **Cruise:** S310      **Latitude:** 37.692      **Year:** 2010  
**Project:** PACOOS      **Station:** 60-57.5      **Longitude:** -123.431      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 4      **Secchi Depth:** 5      **Day Of Year:** 194

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	2.2	12	13.821	33.630	25.166	83	11.822	0.299	1.305	15.101
5	4.4	11	13.817	33.629	25.166	82	11.330	0.316	1.587	15.316
10	9.4	10	13.205	33.627	25.288	82	11.449	0.301	1.459	14.462
20	19.8	9	11.925	33.676	25.575	84	14.643	0.520	1.488	15.764
30	27.9	8	10.403	33.610	25.798	89	20.478	0.645	1.873	21.024
40	39.7	7	10.032	33.751	25.972	90	23.948	0.558	2.196	26.359
60	60.6	6	9.458	33.802	26.106	91	24.454	0.073	2.048	26.949
80	78.3	5	9.118	33.871	26.216	91	28.388	0.024	1.968	31.868
100	99.7	4	8.776	33.933	26.318	91	28.431	0.051	2.182	33.558
150	150.5	3	8.310	34.037	26.471	91	30.841	0.088	2.492	40.917
205	204.9	2	7.603	34.060	26.594	91	32.648	0.113	2.952	45.386
995	1007.1	1	3.915	34.445	27.353	91	---	---	---	---

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	12	0.702	0.237	0	100	74.750	106.494	0
5	11	0.859	0.295	0	50	70.284	100.132	6
10	10	0.887	0.379	5	30	67.867	79.015	9
20	9	1.108	0.605	5	15	55.609	64.743	14
30	8	0.489	0.346	10	5	33.854	38.183	22
40	7	0.273	0.284	10	1	6.673	7.527	35
60	6	0.115	0.190	20	0.1	0.569	0.513	62
80	5	0.102	0.155					
100	4	0.050	0.190					
150	3	0.024	0.119					
205	2	0.018	0.095					
995	1	0.010	0.000					

### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 29.66 mg m-2      Carbon Fixation: 1590.7 mg m-2  
 Phaeophytin: 11.43 mg m-2      Productivity Index: 53.64

\* **Abbreviations:** *DEP* Depth, *PRESS* Pressure, *BTL* Bottle, *TEMP* Temperature, *SAL* Salinity, *TRANSMISS* Transmissivity, *S.I.* Surface Intensity, *CHL* Chlorophyll *a*, *PHAEO* Phaeophytin, *PROD INDEX* Productivity Index

**Date GMT:** Jul 13, 2010 10:38      **Cruise:** S310      **Latitude:** 37.615      **Year:** 2010  
**Project:** PACOOS      **Station:** 60-60      **Longitude:** -123.611      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 5      **Secchi Depth:** 7      **Day Of Year:** 194

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.3	12	14.142	33.663	25.124	83	9.669	0.247	1.104	12.992
5	4.0	11	14.144	33.663	25.124	83	9.759	0.254	1.141	13.008
10	9.0	10	13.870	33.661	25.179	83	10.420	0.267	1.280	13.800
20	19.7	9	12.010	33.590	25.493	86	14.133	0.460	1.416	16.593
30	28.8	8	11.277	33.634	25.662	87	15.378	0.635	1.674	17.859
40	40.7	7	9.959	33.594	25.861	90	22.398	0.637	1.851	24.302
60	59.3	6	9.272	33.681	26.042	90	26.556	0.100	2.155	28.492
80	79.6	5	9.150	33.857	26.200	91	29.139	0.066	2.452	32.260
100	98.9	4	8.971	33.928	26.283	91	29.645	0.068	2.050	34.137
150	150.8	3	8.189	34.010	26.468	91	31.081	0.077	2.151	39.171
200	200.2	2	7.702	34.050	26.572	91	33.856	0.140	2.206	46.972
500	504.1	1	5.710	34.251	26.997	91	37.956	0.011	2.732	75.173

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	12	0.767	0.224	0	100	60.762	79.265	0
5	11	0.730	0.218	5	50	70.424	96.521	6
10	10	0.767	0.284	5	30	62.745	85.997	10
20	9	0.979	0.571	10	15	44.307	57.799	15
30	8	0.933	0.557	10	5	22.668	29.571	23
40	7	0.298	0.273	20	1	5.496	5.614	35
60	6	0.115	0.183	30	0.1	0.457	0.490	60
80	5	0.053	0.167					
100	4	0.054	0.145					
150	3	0.021	0.163					
200	2	0.018	0.095					
500	1	0.012	0.039					

### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 27.67 mg m-2      Carbon Fixation: 1367.1 mg m-2  
 Phaeophytin: 10.80 mg m-2      Productivity Index: 49.42

\* **Abbreviations:** *DEP* Depth, *PRESS* Pressure, *BTL* Bottle, *TEMP* Temperature, *SAL* Salinity, *TRANSMISS* Transmissivity, *S.I.* Surface Intensity, *CHL* Chlorophyll *a*, *PHAEO* Phaeophytin, *PROD INDEX* Productivity Index



**Date GMT:** Jul 13, 2010 14:27      **Cruise:** S310      **Latitude:** 37.450      **Year:** 2010  
**Project:** PACOOS      **Station:** 60-65      **Longitude:** -123.968      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 6      **Secchi Depth:** 11      **Day Of Year:** 194

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.3	12	13.447	33.525	25.161	85	10.177	0.179	1.275	15.718
5	4.2	11	13.381	33.519	25.170	85	10.135	0.171	1.300	14.987
10	10.7	10	13.138	33.512	25.213	85	14.962	0.486	1.560	19.743
20	21.2	9	11.675	33.696	25.637	87	15.029	0.492	1.534	19.819
30	30.9	8	10.996	33.666	25.738	89	18.818	0.622	1.895	22.229
40	40.4	7	10.073	33.659	25.893	90	24.023	0.444	2.031	26.659
60	60.3	6	8.808	33.731	26.155	91	26.875	0.088	2.200	30.535
80	80.5	5	8.630	33.857	26.281	90	29.282	0.019	2.190	35.212
100	101.2	4	8.273	33.896	26.366	90	29.504	0.066	2.254	36.453
150	150.2	3	7.658	33.944	26.495	91	30.417	0.072	2.378	41.215
200	201.2	2	7.149	34.011	26.619	91	33.278	0.021	2.700	49.579
1000	1010.7	1	3.692	34.463	27.391	91	44.114	0.012	3.522	129.475

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	12	0.739	0.226	0	100	52.376	70.888	0
5	11	0.785	0.222	5	50	54.925	69.966	6
10	10	0.711	0.262	10	30	57.158	80.374	10
20	9	1.099	0.563	10	15	41.777	58.746	15
30	8	0.441	0.327	20	5	20.405	18.566	23
40	7	0.461	0.341	30	1	1.798	4.072	36
60	6	0.060	0.129	40	0.1	0.025	0.054	61
80	5	0.036	0.165					
100	4	0.029	0.160					
150	3	0.016	0.074					
200	2	0.014	0.031					
1000	1	0.010	0.004					

### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 28.75 mg m-2      Carbon Fixation: 1199.2 mg m-2  
 Phaeophytin: 12.89 mg m-2      Productivity Index: 41.72

\* **Abbreviations:** *DEP* Depth, *PRESS* Pressure, *BTL* Bottle, *TEMP* Temperature, *SAL* Salinity, *TRANSMISS* Transmissivity, *S.I.* Surface Intensity, *CHL* Chlorophyll *a*, *PHAEO* Phaeophytin, *PROD INDEX* Productivity Index

**Date GMT:** Jul 13, 2010 18:04      **Cruise:** S310      **Latitude:** 37.281      **Year:** 2010  
**Project:** PACOOS      **Station:** 60-70      **Longitude:** -124.329      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 7      **Secchi Depth:** 13      **Day Of Year:** 194

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.5	12	13.252	33.006	24.799	88	6.027	0.134	0.777	8.350
5	4.8	11	12.895	33.023	24.883	86	5.983	0.144	0.964	8.485
10	9.6	10	12.495	33.032	24.967	87	6.521	0.141	0.943	8.612
20	18.9	9	11.117	33.108	25.282	88	10.354	0.216	1.304	12.252
30	30.4	8	10.315	33.149	25.454	90	10.167	0.201	1.277	11.769
40	39.7	7	10.053	33.323	25.634	90	14.173	0.304	1.539	16.048
60	58.5	6	10.347	33.566	25.774	90	19.745	0.397	1.808	22.537
80	80.6	5	9.869	33.594	25.876	90	18.244	0.265	1.848	21.118
100	102.3	4	8.630	33.684	26.146	91	24.472	0.051	1.959	27.290
150	152.8	3	8.424	34.005	26.429	90	31.593	0.011	2.472	40.561
200	203.0	2	8.001	34.093	26.562	90	32.731	0.003	2.644	46.493
1000	1011.1	1	3.740	34.447	27.373	91	44.536	0.018	3.664	128.680

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	12	0.403	0.126	0	100	35.561	88.312	0
5	11	0.403	0.126	5	50	36.971	91.814	7
10	10	0.544	0.172	10	30	38.306	70.417	12
20	9	0.610	0.243	10	15	23.946	44.019	19
40	7	0.227	0.249	20	5	11.139	18.274	29
60	6	0.199	0.123	40	1	0.902	3.971	46
80	5	0.124	0.174	60	0.1	0.191	0.958	76
100	4	0.036	0.101					
150	3	0.026	0.139					
200	2	0.024	0.185					
1000	1	0.011	0.019					

### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 22.10 mg m-2      Carbon Fixation: 941.35 mg m-2  
 Phaeophytin: 9.18 mg m-2      Productivity Index: 42.60

\* **Abbreviations:** **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll *a*, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 13, 2010 22:17      **Cruise:** S310      **Latitude:** 37.114      **Year:** 2010  
**Project:** PACOOS      **Station:** 60-75      **Longitude:** -124.694      **Work Week:** 29  
**Platform:** MCARTHURII      **Cast:** 8      **Secchi Depth:** ---      **Day Of Year:** 194

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.5	12	14.320	32.988	24.566	88	4.741	0.083	0.686	7.351
5	7.5	10	13.543	33.089	24.804	88	7.586	0.138	1.016	10.012
5	5.2	11	13.943	33.044	24.687	88	---	---	---	---
20	18.7	9	11.112	33.213	25.365	88	---	---	---	---
30	29.4	8	10.636	33.275	25.496	89	14.456	0.196	1.375	15.668
40	40.8	7	10.259	33.320	25.597	90	15.771	0.197	1.451	17.684
60	60.3	6	9.723	33.510	25.835	90	19.163	0.337	1.893	22.992
80	79.6	5	8.859	33.615	26.056	91	25.328	0.058	2.051	28.271
100	98.9	4	8.576	33.722	26.184	91	26.280	0.056	2.259	30.170
150	150.4	3	7.809	33.908	26.445	91	27.707	0.015	2.154	35.849
200	201.9	2	6.945	33.939	26.591	91	30.773	0.008	2.341	45.206
1000	1008.5	1	3.664	34.469	27.397	91	44.626	0.000	3.431	126.486

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	12	0.506	0.133	0	100	54.142	106.975	0
5	10	0.588	0.189	10	50	77.283	131.363	7
30	8	0.542	0.192	10	30	58.834	100.004	11
40	7	0.290	0.184	30	15	30.126	55.569	18
60	6	0.147	0.234	30	5	12.128	22.370	28
80	5	0.069	0.066	40	1	1.210	4.173	45
100	4	0.028	0.089	60	0.1	0.258	1.758	76
150	3	0.013	0.060					
200	2	0.014	0.037					
1000	1	0.008	0.009					

### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 22.77 mg m-2      Carbon Fixation: 1383.4 mg m-2  
 Phaeophytin: 8.40 mg m-2      Productivity Index: 60.75

\* Abbreviations: **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll *a*, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 14, 2010 01:43      **Cruise:** S310      **Latitude:** 36.946      **Year:** 2010  
**Project:** PACOOS      **Station:** 60-80      **Longitude:** -125.050      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 9      **Secchi Depth:** 15      **Day Of Year:** 195

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.5	12	13.083	33.012	24.836	87	6.923	0.148	0.748	9.106
5	4.8	11	13.033	33.011	24.846	87	6.894	0.166	0.933	8.164
10	10.0	10	12.671	33.037	24.937	87	8.131	0.165	0.940	10.001
20	20.8	9	11.243	33.105	25.257	86	9.990	0.215	1.341	12.042
30	30.2	8	10.509	33.069	25.358	87	12.318	0.194	1.235	14.206
40	39.2	7	10.151	33.317	25.612	89	16.230	0.211	1.499	17.895
60	60.0	6	9.284	33.470	25.875	90	19.934	0.189	1.708	22.843
80	81.2	5	8.860	33.669	26.098	91	25.622	0.077	2.003	28.293
100	99.9	4	8.673	33.801	26.230	91	28.488	0.158	2.333	34.593
150	152.6	3	8.055	33.976	26.461	91	31.978	0.031	2.762	42.130
200	201.4	2	7.691	34.036	26.562	91	---	---	---	---
1000	1012.3	1	3.719	34.469	27.392	91	44.353	0.004	3.471	128.883

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	12	0.545	0.213	0	100	58.245	106.889	0
5	11	0.598	0.223	5	50	55.867	93.493	6
10	10	0.877	0.371	10	30	53.427	60.892	10
20	9	1.025	0.456	20	15	30.818	30.062	15
30	8	0.961	0.521	30	5	19.480	20.281	23
40	7	0.481	0.302	40	1	1.980	4.115	35
60	6	0.096	0.328	60	0.1	0.000	0.000	57
80	5	0.055	0.163					
100	4	0.044	0.148					
150	3	0.031	0.169					
1000	1	0.009	0.012					

### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 27.62 mg m-2      Carbon Fixation: 1113.2 mg m-2  
 Phaeophytin: 13.32 mg m-2      Productivity Index: 40.31

\* **Abbreviations:** **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll *a*, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 14, 2010 05:09      **Cruise:** S310      **Latitude:** 36.781      **Year:** 2010  
**Project:** PACOOS      **Station:** 60-85      **Longitude:** -125.412      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 10      **Secchi Depth:** 15      **Day Of Year:** 195

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	2.3	15	13.726	32.532	24.336	89	0.010	0.006	0.602	1.311
5	3.9	14	13.724	32.532	24.337	89	0.046	0.021	0.766	1.449
10	9.5	13	13.717	32.531	24.338	88	0.007	0.006	0.534	1.098
20	19.4	12	13.597	32.538	24.368	88	0.007	0.012	0.661	1.646
30	28.8	11	13.064	32.562	24.492	87	0.122	0.025	0.566	2.369
40	40.5	10	12.705	32.581	24.577	88	0.550	0.067	0.685	2.318
60	60.4	9	12.388	32.609	24.660	90	1.383	0.248	0.865	3.553
85	84.5	8	11.658	32.745	24.901	90	3.422	0.186	0.923	4.837
100	102.7	7	11.002	32.877	25.122	91	5.823	0.145	1.074	6.555
150	151.3	5	8.929	33.618	26.047	91	25.017	0.019	2.157	28.337
150	153.2	6	8.908	33.629	26.059	91	---	---	---	---
200	203.8	4	8.300	33.930	26.389	91	30.025	0.023	2.600	37.198
250	252.6	3	7.747	34.008	26.532	91	---	---	---	---
470	475.7	1	5.609	34.108	26.896	91	---	---	---	---
1000	1011.4	2	3.756	34.452	27.375	91	44.320	0.103	3.522	127.238

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
20	12	0.298	0.056	0	100	15.361	51.492	0
30	11	0.296	0.065	5	50	23.120	77.985	9
40	10	0.308	0.052	10	30	16.073	52.104	15
60	9	0.459	0.112	20	15	17.553	38.241	22
85	8	0.831	0.314	30	5	19.485	23.441	32
100	7	0.850	0.356	40	1	3.099	3.647	45
150	6	0.312	0.143	60	0.1	0.033	0.107	68
150	5	0.171	0.098					
200	4	0.173	0.114					
250	3	0.015	0.055					
470	1	0.011	0.008					
1000	2	0.022	0.056					

### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 24.32 mg m-2      Carbon Fixation: 733.18 mg m-2  
 Phaeophytin: 7.88 mg m-2      Productivity Index: 30.14

\* Abbreviations: **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll *a*, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 14, 2010 08:43      **Cruise:** S310      **Latitude:** 36.613      **Year:** 2010  
**Project:** PACOOS      **Station:** 60-90      **Longitude:** -125.777      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 11      **Secchi Depth:** ---      **Day Of Year:** 195

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

# Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
195	195.9	24	8.443	33.741	26.219	91	---	---	---	---
250	251.9	23	7.725	33.922	26.467	91	22.206	0.037	2.306	27.928
255	255.9	22	7.619	33.920	26.481	91	---	---	---	---
355	360.0	1	7.257	34.151	26.714	91	---	---	---	---
500	503.3	21	5.787	34.152	26.909	91	32.748	0.004	2.732	68.046
750	755.3	20	4.615	34.332	27.189	91	42.038	0.005	3.404	100.374
1000	1010.0	19	3.809	34.445	27.364	91	44.213	0.000	3.448	126.113
1040	1048.2	18	3.699	34.458	27.386	91	---	---	---	---
1110	1121.2	2	3.496	34.478	27.422	91	---	---	---	---
1200	1213.3	3	3.309	34.493	27.452	91	---	---	---	---
1415	1428.1	4	2.863	34.538	27.528	91	---	---	---	---
1505	1524.2	17	2.652	34.551	27.558	91	33.911	0.000	2.936	123.785
2005	2027.9	16	1.990	34.613	27.662	91	39.870	0.000	3.145	160.497
2515	2550.3	15	1.736	34.648	27.710	91	40.334	0.009	3.275	167.430
2635	2669.8	14	1.692	34.655	27.719	91	---	---	---	---
2710	2748.6	5	1.671	34.658	27.723	91	---	---	---	---
3000	3042.0	13	1.600	34.668	27.736	91	38.983	0.005	2.988	159.006
3170	3217.2	6	1.578	34.672	27.741	91	---	---	---	---
3380	3435.1	7	1.536	34.678	27.749	91	---	---	---	---
3450	3502.1	12	1.521	34.680	27.752	91	37.081	0.003	2.863	150.660
3500	3554.2	11	1.515	34.681	27.753	91	---	---	---	---
3525	3581.1	8	1.515	34.682	27.754	91	---	---	---	---
3920	3988.6	9	1.491	34.689	27.761	91	37.527	0.022	2.909	160.184
3920	3986.3	10	1.491	34.689	27.761	91	33.361	0.019	2.723	147.756

\* Abbreviations: **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 14, 2010 13:17      **Cruise:** S310      **Latitude:** 36.613      **Year:** 2010  
**Project:** PACOOS      **Station:** 60-90      **Longitude:** -125.774      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 12      **Secchi Depth:** 15      **Day Of Year:** 195

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	2.4	12	14.249	32.550	24.242	89	0.017	0.008	0.422	1.480
5	5.4	11	14.242	32.550	24.244	89	0.012	0.009	0.455	1.440
10	10.3	10	14.245	32.550	24.243	89	0.030	0.006	0.433	1.001
20	19.4	9	14.241	32.547	24.242	89	0.006	0.010	0.575	1.247
30	30.3	8	12.977	32.552	24.502	89	0.021	0.010	0.592	0.777
40	41.1	7	12.695	32.582	24.580	88	0.135	0.034	0.463	1.838
60	61.8	6	12.297	32.639	24.700	90	1.450	0.114	0.661	2.322
85	83.6	5	12.075	32.664	24.761	91	1.969	0.148	0.673	2.592
100	103.2	4	11.747	32.689	24.841	91	3.131	0.194	0.801	4.064
155	155.3	3	9.712	33.463	25.800	90	19.177	0.272	1.794	21.463
200	202.4	1	8.318	33.808	26.290	91	25.043	0.014	2.011	29.318
200	203.6	2	8.286	33.821	26.306	91	24.796	0.029	2.089	29.206

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	12	0.172	0.039	0	100	11.531	67.127	0
5	11	0.154	0.039	5	50	15.660	101.532	11
10	10	0.155	0.039	10	30	11.587	74.675	20
20	9	0.171	0.051	20	15	10.479	61.331	29
30	8	0.285	0.128	30	5	8.510	29.820	40
40	7	0.628	0.268	40	1	5.211	8.297	56
60	6	0.271	0.163	60	0.1	0.473	1.746	86
85	5	0.120	0.087					
100	4	0.127	0.128					
155	3	0.139	0.174					
200	2	0.008	0.018					
200	1	0.006	0.017					

### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 14.45 mg m-2      Carbon Fixation: 586.18 mg m-2  
 Phaeophytin: 5.32 mg m-2      Productivity Index: 40.57

\* **Abbreviations:** *DEP* Depth, *PRESS* Pressure, *BTL* Bottle, *TEMP* Temperature, *SAL* Salinity, *TRANSMISS* Transmissivity, *S.I.* Surface Intensity, *CHL* Chlorophyll *a*, *PHAEO* Phaeophytin, *PROD INDEX* Productivity Index

**Date GMT:** Jul 14, 2010 15:57      **Cruise:** S310      **Latitude:** 36.330      **Year:** 2010  
**Project:** PACOOS      **Station:** 61.75-90      **Longitude:** -125.554      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 13      **Secchi Depth:** 18      **Day Of Year:** 195

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	2.1	12	15.605	33.025	24.317	89	0.041	0.014	0.485	2.937
5	5.4	11	15.607	33.024	24.316	89	0.020	0.009	0.554	2.741
10	10.6	10	15.389	32.985	24.334	89	0.629	0.036	0.711	3.075
20	20.3	9	13.002	32.828	24.711	88	4.069	0.128	0.828	5.723
30	30.5	8	12.524	32.825	24.801	89	3.342	0.152	1.155	4.334
40	39.6	7	11.595	32.737	24.907	90	3.851	0.161	0.881	4.268
60	60.2	6	10.355	32.865	25.225	90	10.113	0.187	0.925	10.060
80	79.7	5	9.891	33.154	25.529	91	13.879	0.121	1.767	13.369
100	99.3	4	9.542	33.449	25.817	90	19.735	0.180	1.778	21.880
150	149.2	3	8.915	33.811	26.201	91	28.232	0.020	2.215	32.229
200	201.3	2	8.279	33.960	26.416	91	30.359	0.028	2.351	36.723
1005	1012.4	1	3.754	34.461	27.383	91	42.053	0.005	3.439	116.013

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	12	0.182	0.043	0	100	13.999	76.944	0
5	11	0.207	0.052	5	50	19.964	96.503	9
10	10	0.355	0.193	10	30	48.757	137.480	14
20	9	0.600	0.269	20	15	38.699	64.464	21
30	8	0.453	0.383	30	5	18.942	41.857	31
40	7	0.200	0.124	40	1	2.664	13.293	49
60	6	0.260	0.125	80	0.1	0.152	2.846	83
80	5	0.054	0.058					
100	4	0.108	0.157					
150	3	0.023	0.115					
200	2	0.010	0.056					
1005	1	0.001	0.007					

### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 17.63 mg m-2      Carbon Fixation: 1103.8 mg m-2  
 Phaeophytin: 10.50 mg m-2      Productivity Index: 62.62

\* **Abbreviations:** *DEP* Depth, *PRESS* Pressure, *BTL* Bottle, *TEMP* Temperature, *SAL* Salinity, *TRANSMISS* Transmissivity, *S.I.* Surface Intensity, *CHL* Chlorophyll *a*, *PHAEO* Phaeophytin, *PROD INDEX* Productivity Index



**Date GMT:** Jul 14, 2010 19:02      **Cruise:** S310      **Latitude:** 36.040      **Year:** 2010  
**Project:** PACOOS      **Station:** 63.5-90      **Longitude:** -125.338      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 14      **Secchi Depth:** 19      **Day Of Year:** 195

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.6	12	14.916	32.923	24.389	88	2.130	0.066	0.568	3.995
5	5.1	11	14.901	32.922	24.392	88	2.267	0.079	0.689	4.358
10	9.2	10	14.805	32.920	24.411	88	2.239	0.082	0.834	3.981
20	20.9	9	13.882	32.922	24.606	88	3.340	0.129	0.877	5.211
30	29.2	8	13.159	33.068	24.865	89	5.936	0.183	1.009	6.881
40	40.6	7	12.475	33.049	24.984	89	---	---	---	---
60	59.6	6	10.722	33.091	25.338	90	12.291	0.366	1.376	12.213
80	80.1	5	10.048	33.265	25.589	91	15.639	0.273	1.524	15.650
100	100.8	4	9.691	33.453	25.796	91	20.188	0.109	1.759	20.420
150	150.2	3	8.989	33.762	26.151	91	23.597	0.065	2.135	27.057
200	200.8	2	8.190	33.990	26.452	91	26.722	0.017	2.650	33.224
1000	1009.2	1	3.868	34.459	27.369	91	43.991	0.010	3.546	125.880

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	12	0.332	0.083	0	100	35.859	107.851	0
5	11	0.322	0.077	10	50	71.321	216.918	8
10	10	0.329	0.083	10	30	73.531	223.640	14
20	9	0.399	0.168	20	15	46.165	115.708	22
30	8	0.481	0.207	30	5	30.056	62.464	33
60	6	0.130	0.122	60	1	2.064	15.852	52
80	5	0.050	0.112	80	0.1	0.002	0.034	86
100	4	0.039	0.094					
150	3	0.025	0.102					
200	2	0.005	0.037					
1000	1	0.001	0.002					

### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 18.13 mg m-2      Carbon Fixation: 2060.6 mg m-2  
 Phaeophytin: 7.30 mg m-2      Productivity Index: 113.67

\* Abbreviations: **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll *a*, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 14, 2010 22:19      **Cruise:** S310      **Latitude:** 35.752      **Year:** 2010  
**Project:** PACOOS      **Station:** 65.25-90      **Longitude:** -125.121      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 15      **Secchi Depth:** 19      **Day Of Year:** 195

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.6	12	16.250	32.993	24.148	89	0.002	0.003	0.507	2.667
5	4.0	11	16.091	32.997	24.187	89	-0.059	0.000	0.509	2.345
10	9.4	10	16.025	33.027	24.225	89	0.080	0.013	0.504	15.794
20	18.5	9	15.651	32.993	24.282	88	0.476	0.046	0.577	2.139
30	28.1	8	15.015	32.896	24.347	88	0.028	0.025	0.708	2.378
40	39.4	7	14.081	32.782	24.457	88	0.335	0.038	0.733	2.901
60	61.0	6	13.209	32.947	24.761	90	0.861	0.405	0.772	2.462
75	77.9	5	12.003	33.021	25.052	90	6.643	0.021	0.833	5.467
100	99.6	4	10.624	33.114	25.373	91	10.520	0.041	1.249	9.124
150	149.0	3	9.043	33.658	26.061	91	29.624	0.053	2.506	40.171
200	200.6	2	8.504	33.942	26.367	91	28.951	0.046	2.378	34.708
1005	1015.6	1	3.934	34.468	27.370	91	36.801	0.013	3.125	108.903

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	12	0.139	0.040	0	100	8.586	61.977	0
5	11	0.148	0.034	10	50	12.397	75.408	12
10	10	0.164	0.041	10	30	16.708	101.630	19
20	9	0.256	0.064	20	15	15.975	62.443	28
30	8	0.282	0.094	30	5	10.012	35.544	40
40	7	0.502	0.217	60	1	4.019	13.816	57
60	6	0.291	0.180	80	0.1	0.574	5.548	89
75	5	0.103	0.086					
100	4	0.066	0.067					
150	3	0.003	0.009					
200	2	0.004	0.011					
1005	1	0.001	0.003					

### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 12.89 mg m-2      Carbon Fixation: 652.15 mg m-2  
 Phaeophytin: 4.47 mg m-2      Productivity Index: 50.59

\* **Abbreviations:** *DEP* Depth, *PRESS* Pressure, *BTL* Bottle, *TEMP* Temperature, *SAL* Salinity, *TRANSMISS* Transmissivity, *S.I.* Surface Intensity, *CHL* Chlorophyll *a*, *PHAEO* Phaeophytin, *PROD INDEX* Productivity Index

**Date GMT:** Jul 15, 2010 01:36      **Cruise:** S310      **Latitude:** 35.455      **Year:** 2010  
**Project:** PACOOS      **Station:** 67-90      **Longitude:** -124.908      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 16      **Secchi Depth:** 19      **Day Of Year:** 196

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.1	12	17.304	32.952	23.872	89	0.161	0.029	0.690	2.589
5	5.7	11	16.225	32.942	24.114	89	0.050	0.003	0.527	2.389
10	9.9	10	15.693	32.955	24.244	89	0.142	0.025	0.699	2.605
20	19.2	9	15.341	32.946	24.314	88	0.160	0.018	0.687	2.157
30	29.0	8	14.955	32.921	24.380	88	0.015	0.024	0.697	1.786
40	40.2	7	14.332	32.885	24.484	88	0.231	0.047	0.842	1.750
60	59.9	6	13.339	32.858	24.667	89	2.305	0.181	0.925	4.172
80	81.5	5	11.987	33.077	25.098	90	7.106	0.042	1.048	6.514
100	102.2	4	10.248	33.269	25.558	91	14.575	0.027	1.603	13.556
150	152.9	3	9.451	33.853	26.148	91	27.700	0.028	1.746	30.066
200	201.3	1	8.750	33.986	26.363	91	30.222	0.013	2.418	36.252
200	201.5	2	8.758	33.982	26.359	91	24.759	0.016	2.037	29.758

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	12	0.138	0.027	0	100	11.258	81.809	0
5	11	0.139	0.024	5	50	13.949	100.022	12
10	10	0.147	0.029	10	30	12.228	83.266	20
20	9	0.182	0.045	20	15	11.909	65.457	30
30	8	0.254	0.070	30	5	10.605	41.756	42
40	7	0.512	0.191	60	1	4.857	11.660	58
60	6	0.417	0.220	80	0.1	0.336	2.032	86
80	5	0.165	0.119					
100	4	0.040	0.059					
150	3	0.010	0.056					
200	2	0.011	0.055					
200	1	0.010	0.057					

### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 12.37 mg m-2      Carbon Fixation: 636.10 mg m-2  
 Phaeophytin: 3.85 mg m-2      Productivity Index: 51.44

\* **Abbreviations:** *DEP* Depth, *PRESS* Pressure, *BTL* Bottle, *TEMP* Temperature, *SAL* Salinity, *TRANSMISS* Transmissivity, *S.I.* Surface Intensity, *CHL* Chlorophyll *a*, *PHAEO* Phaeophytin, *PROD INDEX* Productivity Index

**Date GMT:** Jul 15, 2010 03:06      **Cruise:** S310      **Latitude:** 35.461      **Year:** 2010  
**Project:** PACOOS      **Station:** 67-90      **Longitude:** -124.891      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 17      **Secchi Depth:** ---      **Day Of Year:** 196

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

#### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.8	12	16.537	32.944	24.044	89	0.010	0.041	0.655	2.577
245	248.8	11	7.914	34.060	26.548	91	32.512	0.020	2.544	43.735
500	504.5	10	5.690	34.206	26.964	91	33.023	0.010	2.972	65.793
750	757.2	9	4.468	34.347	27.217	91	43.544	0.015	3.469	110.326
1000	1010.3	8	3.864	34.464	27.374	91	---	---	---	---
1500	1516.9	7	2.793	34.564	27.555	91	43.382	0.017	3.399	144.447
2000	2024.0	6	2.078	34.619	27.660	91	41.657	0.040	3.362	166.317
2500	2533.7	5	1.788	34.648	27.706	91	40.201	0.000	2.814	172.297
3000	3044.4	4	1.630	34.667	27.733	91	19.873	0.011	2.674	153.445
3500	3556.6	3	1.534	34.680	27.751	91	18.569	0.005	2.699	156.382
4000	4068.5	2	1.497	34.690	27.762	91	33.029	0.037	2.679	160.814
4005	4071.8	1	1.497	34.690	27.762	91	35.012	0.000	2.778	162.302

\* **Abbreviations:** **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 15, 2010 07:00      **Cruise:** S310      **Latitude:** 35.544      **Year:** 2010  
**Project:** PACOOS      **Station:** NPS8      **Longitude:** -124.732      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 18      **Secchi Depth:** ---      **Day Of Year:** 196

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

#### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	2.5	12	15.855	32.870	24.143	87	0.029	0.000	0.468	1.064
50	50.2	11	13.856	32.840	24.548	87	0.974	0.073	0.698	2.228
100	101.5	10	10.549	33.127	25.397	91	13.098	0.041	1.379	11.593
200	200.9	9	8.526	33.958	26.376	91	29.847	0.048	2.310	35.290
300	301.9	8	7.513	34.069	26.614	91	33.421	0.010	2.504	48.332
400	402.8	7	6.527	34.130	26.797	91	34.067	0.000	2.763	58.039
500	504.3	6	6.073	34.262	26.960	91	39.425	0.010	3.221	77.432
600	607.6	5	5.243	34.268	27.067	91	37.486	0.001	3.131	81.751
700	707.5	4	4.760	34.315	27.159	91	39.953	0.049	3.095	93.018
800	807.5	3	4.493	34.392	27.250	91	38.681	0.001	3.183	94.811
900	907.5	2	4.226	34.438	27.315	91	39.313	0.042	3.349	99.392
1000	1009.5	1	3.940	34.474	27.374	91	43.091	0.052	3.315	118.001

\* **Abbreviations:** **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 15, 2010 12:02      **Cruise:** S310      **Latitude:** 35.456      **Year:** 2010  
**Project:** PACOOS      **Station:** 67-90      **Longitude:** -124.902      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 19      **Secchi Depth:** ---      **Day Of Year:** 196

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

#### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
10	9.7	3	15.808	32.905	24.179	89	---	---	---	---
10	10.5	4	15.781	32.906	24.187	89	---	---	---	---
10	9.6	5	15.801	32.904	24.180	89	---	---	---	---
10	9.8	6	15.790	32.903	24.182	89	---	---	---	---
10	10.2	7	15.761	32.902	24.188	89	---	---	---	---
10	9.8	8	15.757	32.902	24.188	89	---	---	---	---
1000	1010.8	1	3.912	34.462	27.367	91	---	---	---	---
1005	1012.4	2	3.913	34.463	27.368	91	---	---	---	---

#### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
10	7	0.110	0.029	10	50	9.998	90.777	---

\* **Abbreviations:** **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 15, 2010 19:25      **Cruise:** S310      **Latitude:** 35.462      **Year:** 2010  
**Project:** PACOOS      **Station:** 67-90      **Longitude:** -124.912      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 20      **Secchi Depth:** ---      **Day Of Year:** 196

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

#### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.2	11	16.718	32.926	23.989	89	---	---	---	---
10	10.2	5	15.806	32.959	24.221	89	---	---	---	---
10	10.3	6	15.800	32.961	24.225	89	---	---	---	---
10	10.4	7	15.788	32.964	24.230	89	---	---	---	---
10	9.7	8	15.822	32.958	24.217	89	---	---	---	---
10	10.1	9	15.812	32.959	24.221	89	---	---	---	---
10	10.3	10	15.789	32.964	24.229	89	---	---	---	---
45	45.3	4	14.232	32.866	24.490	87	---	---	---	---
75	76.0	3	12.489	33.077	25.003	90	---	---	---	---
1000	1010.5	1	3.857	34.468	27.378	91	---	---	---	---
1000	1011.8	2	3.854	34.469	27.379	91	---	---	---	---

#### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)
10	10	0.122	0.030

\* **Abbreviations:** **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 16, 2010 02:40      **Cruise:** S310      **Latitude:** 35.460      **Year:** 2010  
**Project:** PACOOS      **Station:** 67-90      **Longitude:** -124.903      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 21      **Secchi Depth:** ---      **Day Of Year:** 197

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
10	9.2	9	15.833	32.946	24.206	89	---	---	---	---
10	9.6	10	15.826	32.947	24.208	89	---	---	---	---
10	9.5	11	15.829	32.947	24.207	89	---	---	---	---
10	9.6	12	15.823	32.947	24.209	89	---	---	---	---
30	32.6	8	14.722	32.893	24.408	89	---	---	---	---
80	81.2	7	11.945	33.085	25.113	90	---	---	---	---
100	101.5	6	10.117	33.301	25.606	91	---	---	---	---
150	151.7	5	9.162	33.678	26.057	90	---	---	---	---
200	201.4	4	8.632	33.946	26.350	91	---	---	---	---
500	504.7	3	5.750	34.189	26.943	91	---	---	---	---
1000	1009.1	1	3.889	34.457	27.365	91	---	---	---	---
1000	1012.1	2	3.879	34.457	27.366	91	---	---	---	---

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)
10	12	0.111	0.028

\* Abbreviations: **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 16, 2010 07:18      **Cruise:** S310      **Latitude:** 35.461      **Year:** 2010  
**Project:** PACOOS      **Station:** 67-90      **Longitude:** -124.909      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 22      **Secchi Depth:** ---      **Day Of Year:** 197

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
10	8.9	5	15.434	32.941	24.290	89	---	---	---	---
10	9.1	6	15.445	32.943	24.290	89	---	---	---	---
10	8.5	7	15.458	32.944	24.287	89	---	---	---	---
10	9.2	8	15.483	32.943	24.281	89	---	---	---	---
10	8.7	9	15.590	32.945	24.259	89	---	---	---	---
10	8.8	10	15.597	32.943	24.256	89	---	---	---	---
10	8.4	11	15.541	32.945	24.270	89	---	---	---	---
10	8.9	12	15.447	32.944	24.290	89	---	---	---	---
100	101.4	3	10.312	33.297	25.569	91	---	---	---	---
100	101.6	4	10.210	33.297	25.587	91	---	---	---	---
1000	1009.1	1	3.840	34.468	27.380	91	---	---	---	---
1000	1007.5	2	3.838	34.468	27.379	91	---	---	---	---

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)
10	11	0.105	0.030

\* Abbreviations: **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 16, 2010 12:06      **Cruise:** S310      **Latitude:** 35.454      **Year:** 2010  
**Project:** PACOOS      **Station:** 67-90      **Longitude:** -124.915      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 23      **Secchi Depth:** ---      **Day Of Year:** 197

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
10	9.6	3	16.178	32.910	24.100	89	---	---	---	---
10	9.9	4	16.130	32.917	24.116	89	---	---	---	---
10	9.7	5	16.126	32.918	24.118	89	---	---	---	---
10	9.3	6	16.161	32.914	24.107	89	---	---	---	---
10	9.7	7	16.081	32.922	24.131	89	---	---	---	---
10	9.6	8	16.061	32.922	24.136	89	---	---	---	---
10	9.6	9	16.021	32.925	24.148	89	---	---	---	---
10	9.9	10	16.018	32.926	24.149	89	---	---	---	---
10	9.9	11	16.086	32.920	24.128	89	---	---	---	---
10	9.8	12	16.072	32.920	24.132	89	---	---	---	---
995	1003.8	2	3.929	34.456	27.361	91	---	---	---	---
1000	1008.9	1	3.951	34.461	27.362	91	---	---	---	---

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)
10	10	0.117	0.030

\* Abbreviations: **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index



**Date GMT:** Jul 16, 2010 15:23      **Cruise:** S310      **Latitude:** 35.628      **Year:** 2010  
**Project:** PACOOS      **Station:** 67-85      **Longitude:** -124.560      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 24      **Secchi Depth:** 19      **Day Of Year:** 197

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.3	12	16.061	32.926	24.139	88	0.001	0.003	0.508	2.141
5	5.1	11	16.065	32.926	24.138	89	0.016	0.000	0.593	2.013
10	11.0	10	16.002	32.927	24.153	89	0.016	0.039	0.555	2.218
20	19.6	9	14.877	32.880	24.364	88	0.025	0.033	0.715	2.181
30	30.5	8	14.356	32.818	24.427	88	0.002	0.068	0.707	2.178
40	38.9	7	14.313	32.857	24.466	88	0.019	0.024	0.692	1.898
60	61.4	6	12.592	32.890	24.838	89	3.684	0.501	0.724	4.818
80	79.1	5	11.984	32.987	25.029	90	7.191	0.541	1.001	7.823
100	100.1	4	11.291	33.068	25.219	90	9.316	0.071	1.057	8.755
150	151.3	3	9.312	33.767	26.103	90	26.402	0.035	2.137	27.030
200	202.2	2	8.618	33.984	26.382	91	29.805	0.036	2.443	34.632
1000	1008.8	1	3.958	34.455	27.357	91	44.168	0.000	2.887	114.954

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	12	0.126	0.028	0	100	10.682	85.040	0
5	11	0.129	0.028	10	50	10.132	81.868	13
10	10	0.124	0.026	10	30	9.450	76.358	21
20	9	0.169	0.051	20	15	9.942	58.826	31
30	8	0.186	0.062	30	5	6.798	36.621	44
40	7	0.397	0.180	60	1	4.321	8.053	59
60	6	0.537	0.306	80	0.1	0.176	1.050	84
80	5	0.167	0.149					
100	4	0.126	0.117					
150	3	0.009	0.056					
200	2	0.009	0.051					
1000	1	0.001	0.007					

### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 11.87 mg m-2      Carbon Fixation: 502.74 mg m-2  
 Phaeophytin: 4.49 mg m-2      Productivity Index: 42.34

\* **Abbreviations:** *DEP* Depth, *PRESS* Pressure, *BTL* Bottle, *TEMP* Temperature, *SAL* Salinity, *TRANSMISS* Transmissivity, *S.I.* Surface Intensity, *CHL* Chlorophyll *a*, *PHAEO* Phaeophytin, *PROD INDEX* Productivity Index

**Date GMT:** Jul 16, 2010 18:05      **Cruise:** S310      **Latitude:** 35.706      **Year:** 2010  
**Project:** PACOOS      **Station:** NPS7      **Longitude:** -124.384      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 25      **Secchi Depth:** ---      **Day Of Year:** 197

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

# **Physical and Chemical**

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	2.1	12	15.820	32.878	24.156	89	0.000	0.020	0.710	2.212
50	50.6	11	13.313	32.859	24.672	88	2.298	0.449	0.811	3.710
100	100.1	10	11.263	33.106	25.254	91	11.725	0.066	1.381	10.806
200	203.0	9	8.650	33.983	26.376	91	25.882	0.070	2.402	30.681
295	296.6	8	7.798	34.113	26.607	91	33.623	0.000	2.116	47.704
400	403.1	7	6.755	34.167	26.796	91	37.633	0.004	3.029	62.877
500	503.8	6	6.201	34.246	26.931	91	36.701	0.007	3.110	69.359
600	606.8	5	5.280	34.247	27.045	91	41.825	0.015	3.538	88.151
700	706.7	4	4.865	34.327	27.157	91	---	---	---	---
800	806.1	3	4.530	34.374	27.232	91	43.817	0.036	3.652	106.618
900	906.6	2	4.200	34.413	27.298	91	43.563	0.045	3.756	109.234
1000	1010.7	1	3.965	34.452	27.354	91	36.980	0.019	3.240	107.838

\* **Abbreviations:** **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 16, 2010 20:34      **Cruise:** S310      **Latitude:** 35.787      **Year:** 2010  
**Project:** PACOOS      **Station:** 67-80      **Longitude:** -124.203      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 26      **Secchi Depth:** 20      **Day Of Year:** 197

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.8	12	15.782	32.833	24.130	89	0.079	0.000	0.451	1.441
5	4.8	11	15.768	32.833	24.133	89	0.135	0.014	0.645	1.476
10	9.3	10	15.673	32.830	24.152	89	0.171	0.015	0.610	1.565
20	19.4	9	14.631	32.825	24.374	88	0.037	0.008	0.515	1.902
30	29.3	8	14.570	32.846	24.404	88	0.103	0.060	0.545	1.979
40	39.7	7	14.584	32.881	24.428	88	0.276	0.120	0.627	1.860
60	61.0	6	13.569	32.840	24.606	88	1.572	0.264	0.660	2.687
80	81.9	5	12.133	33.041	25.043	90	5.380	0.014	0.752	4.606
100	101.2	4	11.432	33.137	25.247	91	9.689	0.054	1.203	8.709
150	151.9	3	9.404	33.654	25.999	91	21.335	0.046	1.965	22.003
200	202.6	2	8.901	33.969	26.326	91	22.342	0.016	2.060	24.722
1000	1009.9	1	3.966	34.455	27.356	91	37.599	0.002	3.215	112.001

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	12	0.104	0.018	0	100	8.256	79.112	0
5	11	0.105	0.018	10	50	8.269	78.539	14
10	10	0.105	0.024	10	30	7.606	72.243	23
20	9	0.123	0.036	20	15	7.298	59.416	35
30	8	0.147	0.041	40	5	6.157	26.990	47
40	7	0.228	0.072	60	1	4.854	7.508	64
60	6	0.647	0.292	80	0.1	0.121	0.844	93
80	5	0.143	0.102					
100	4	0.053	0.064					
150	3	0.009	0.056					
200	2	0.006	0.044					
1000	1	0.001	0.007					

### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 13.18 mg m-2      Carbon Fixation: 450.57 mg m-2  
 Phaeophytin: 4.54 mg m-2      Productivity Index: 34.20

\* **Abbreviations:** *DEP* Depth, *PRESS* Pressure, *BTL* Bottle, *TEMP* Temperature, *SAL* Salinity, *TRANSMISS* Transmissivity, *S.I.* Surface Intensity, *CHL* Chlorophyll *a*, *PHAEO* Phaeophytin, *PROD INDEX* Productivity Index

**Date GMT:** Jul 16, 2010 23:21      **Cruise:** S310      **Latitude:** 35.871      **Year:** 2010  
**Project:** PACOOS      **Station:** NPS6      **Longitude:** -124.017      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 27      **Secchi Depth:** ---      **Day Of Year:** 197

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

# **Physical and Chemical**

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.2	12	15.691	32.910	24.210	89	-0.011	0.013	0.532	2.506
50	50.2	11	12.221	32.789	24.831	88	3.030	0.146	0.831	4.931
100	102.0	10	10.383	33.199	25.481	91	13.740	0.043	1.345	11.702
200	203.3	9	8.682	34.002	26.387	91	30.325	0.023	2.403	35.203
300	300.5	8	7.487	34.080	26.626	91	34.386	0.006	2.194	47.746
400	402.2	7	6.281	34.090	26.798	91	38.107	0.032	3.069	66.601
500	504.3	6	5.552	34.167	26.950	91	41.145	0.043	3.215	79.487
600	605.5	5	5.099	34.247	27.067	91	40.013	0.071	3.054	81.261
700	706.3	4	4.690	34.319	27.171	91	38.630	0.008	3.273	90.459
795	801.8	3	4.430	34.373	27.242	91	41.044	0.057	2.988	98.722
900	909.8	2	4.155	34.427	27.314	91	39.525	0.000	3.383	109.428
1000	1010.4	1	3.906	34.461	27.367	91	44.441	0.000	3.617	120.824

\* **Abbreviations:** **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 17, 2010 01:42      **Cruise:** S310      **Latitude:** 35.958      **Year:** 2010  
**Project:** PACOOS      **Station:** 67-75      **Longitude:** -123.845      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 28      **Secchi Depth:** 17      **Day Of Year:** 198

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.9	12	15.589	32.929	24.247	87	0.036	0.007	0.358	2.555
5	4.6	11	15.558	32.922	24.248	88	0.044	0.008	0.522	2.323
10	9.1	10	15.502	32.910	24.251	88	0.530	0.069	0.519	2.816
20	20.3	9	15.306	32.897	24.284	88	0.329	0.036	0.505	2.846
30	28.5	8	12.968	32.761	24.665	88	1.688	0.114	0.990	3.886
40	37.9	7	12.229	32.728	24.782	89	2.333	0.114	0.656	3.940
60	59.7	6	11.557	32.769	24.938	90	5.130	0.259	0.921	5.562
80	81.9	5	10.871	32.999	25.240	90	10.089	0.298	1.318	10.116
100	99.5	4	10.445	33.186	25.461	91	15.738	0.138	1.328	15.614
150	151.4	3	8.924	33.656	26.078	91	25.880	0.055	1.932	28.204
200	202.0	2	8.506	33.955	26.377	91	30.898	0.039	2.311	36.714
1000	1010.3	1	3.867	34.453	27.364	91	43.965	0.023	3.350	119.289

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	12	0.268	0.077	0	100	14.060	52.494	0
5	11	0.251	0.078	5	50	16.660	66.320	9
10	10	0.285	0.080	10	30	15.823	55.445	15
20	9	0.415	0.155	20	15	32.863	79.248	22
30	8	0.573	0.280	30	5	4.026	7.031	33
40	7	0.551	0.304	40	1	0.849	1.539	48
60	6	0.278	0.212	60	0.1	0.296	1.066	73
80	5	0.127	0.128					
100	4	0.073	0.113					
150	3	0.018	0.093					
200	2	0.010	0.099					
1000	1	0.001	0.012					

### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 20.06 mg m-2      Carbon Fixation: 643.59 mg m-2  
 Phaeophytin: 8.65 mg m-2      Productivity Index: 32.09

\* **Abbreviations:** *DEP* Depth, *PRESS* Pressure, *BTL* Bottle, *TEMP* Temperature, *SAL* Salinity, *TRANSMISS* Transmissivity, *S.I.* Surface Intensity, *CHL* Chlorophyll *a*, *PHAEO* Phaeophytin, *PROD INDEX* Productivity Index

**Date GMT:** Jul 17, 2010 04:19      **Cruise:** S310      **Latitude:** 36.043      **Year:** 2010  
**Project:** PACOOS      **Station:** NPS5      **Longitude:** -123.673      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 29      **Secchi Depth:** ---      **Day Of Year:** 198

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

# **Physical and Chemical**

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.7	12	15.328	32.853	24.246	89	0.107	0.026	0.463	2.767
50	50.4	11	11.750	32.881	24.990	89	5.748	0.235	1.201	6.133
100	101.0	10	10.282	33.293	25.571	90	16.681	0.253	1.434	16.098
210	211.2	9	7.804	33.906	26.443	91	24.699	0.047	1.800	30.535
300	303.2	8	7.356	34.088	26.651	91	35.269	0.026	2.718	51.177
400	403.9	7	6.362	34.127	26.816	91	35.922	0.007	2.886	60.729
500	503.2	6	5.793	34.194	26.942	91	38.717	0.023	3.134	73.241
600	605.0	5	5.197	34.267	27.071	91	42.361	0.004	3.466	90.479
700	706.8	4	4.806	34.340	27.174	91	43.314	0.006	3.503	100.779
800	806.8	3	4.475	34.381	27.243	91	43.791	0.005	3.574	107.154
900	909.9	2	4.126	34.421	27.313	91	44.184	0.008	3.596	115.549
1000	1011.1	1	3.790	34.460	27.378	91	44.357	0.000	3.566	120.989

\* **Abbreviations:** **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 17, 2010 06:22      **Cruise:** S310      **Latitude:** 36.128      **Year:** 2010  
**Project:** PACOOS      **Station:** 67-70      **Longitude:** -123.491      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 30      **Secchi Depth:** 17      **Day Of Year:** 198

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	2.1	12	15.199	32.890	24.303	89	0.601	0.060	0.431	3.375
5	5.3	11	15.182	32.889	24.306	89	0.645	0.037	0.490	2.965
10	10.2	10	15.175	32.889	24.307	89	0.560	0.031	0.572	2.787
20	19.5	9	14.912	32.987	24.440	88	---	---	---	---
30	29.5	8	13.748	32.901	24.617	88	1.891	0.128	0.685	4.017
40	40.2	7	12.427	32.991	24.948	88	5.080	0.177	0.793	5.245
60	60.3	6	11.098	33.180	25.341	90	10.743	0.105	1.037	9.278
80	79.8	5	10.092	33.295	25.605	90	17.871	0.080	1.445	16.755
100	101.2	4	9.567	33.475	25.833	90	22.238	0.070	1.847	24.922
150	152.4	3	8.289	33.827	26.309	91	19.748	0.026	1.710	19.073
200	202.4	2	7.902	33.996	26.500	91	30.671	0.017	2.413	39.292
995	1007.2	1	3.823	34.462	27.376	91	42.838	0.001	3.523	115.294

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	12	0.226	0.064	0	100	16.755	74.045	0
5	11	0.233	0.067	5	50	25.124	107.950	10
10	10	0.312	0.107	10	30	25.745	82.472	17
20	9	0.392	0.147	20	15	31.833	81.292	25
30	8	0.460	0.196	30	5	19.363	42.099	36
40	7	0.547	0.244	40	1	5.060	9.255	53
60	6	0.180	0.119	60	0.1	6.741	37.430	86
80	5	0.091	0.087					
100	4	0.032	0.072					
150	3	0.011	0.067					
200	2	0.007	0.072					
995	1	0.002	0.011					

### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 20.04 mg m-2      Carbon Fixation: 1099.6 mg m-2  
 Phaeophytin: 7.81 mg m-2      Productivity Index: 54.87

\* **Abbreviations:** *DEP* Depth, *PRESS* Pressure, *BTL* Bottle, *TEMP* Temperature, *SAL* Salinity, *TRANSMISS* Transmissivity, *S.I.* Surface Intensity, *CHL* Chlorophyll *a*, *PHAEO* Phaeophytin, *PROD INDEX* Productivity Index

**Date GMT:** Jul 17, 2010 09:09      **Cruise:** S310      **Latitude:** 36.211      **Year:** 2010  
**Project:** PACOOS      **Station:** NPS4      **Longitude:** -123.312      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 31      **Secchi Depth:** ---      **Day Of Year:** 198

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

# **Physical and Chemical**

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	2.1	12	14.557	33.525	24.931	86	10.253	0.200	1.109	15.350
50	49.6	11	9.787	33.690	25.965	90	24.466	0.347	1.802	26.247
100	100.1	10	8.757	33.930	26.318	90	30.336	0.021	2.230	34.695
200	202.2	9	7.740	34.063	26.576	91	34.149	0.024	2.450	46.051
300	303.2	8	6.939	34.134	26.745	91	37.226	0.025	2.922	58.145
400	403.7	7	6.327	34.213	26.889	91	39.171	0.031	3.215	70.733
500	505.2	6	5.482	34.248	27.022	91	41.615	0.006	3.481	84.433
600	603.4	5	4.935	34.297	27.126	91	43.070	0.000	3.551	95.742
700	705.6	4	4.573	34.356	27.213	91	44.059	0.000	3.653	104.130
800	806.7	3	4.319	34.405	27.279	91	44.122	0.000	3.700	109.231
900	908.5	2	4.019	34.439	27.338	91	44.154	0.006	3.626	117.334
1000	1010.6	1	3.684	34.466	27.394	91	44.738	0.011	3.528	123.987

\* **Abbreviations:** **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index



**Date GMT:** Jul 17, 2010 11:19      **Cruise:** S310      **Latitude:** 36.295      **Year:** 2010  
**Project:** PACOOS      **Station:** 67-65      **Longitude:** -123.133      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 32      **Secchi Depth:** 17      **Day Of Year:** 198

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	3.2	11	14.392	33.219	24.729	89	7.190	0.157	0.602	8.563
0	3.0	12	14.390	33.219	24.729	89	7.148	0.153	0.801	8.357
10	9.8	10	14.382	33.218	24.730	89	7.839	0.188	1.007	9.494
20	20.4	9	11.698	33.477	25.462	87	14.094	0.362	1.295	16.648
30	31.9	8	10.962	33.446	25.572	88	16.176	0.471	1.591	17.347
40	40.2	7	9.563	33.386	25.764	90	20.444	0.350	1.751	20.719
60	60.8	6	9.691	33.575	25.891	90	22.739	0.331	1.689	23.589
80	80.1	5	8.988	33.597	26.022	90	25.160	0.090	1.846	27.660
100	100.5	4	8.938	33.774	26.168	90	28.198	0.020	2.232	30.940
150	151.0	3	8.479	34.020	26.432	91	31.185	0.015	2.466	37.518
200	201.9	2	7.684	34.022	26.552	91	32.805	0.025	2.610	43.540
1000	1010.9	1	3.783	34.470	27.387	91	44.283	0.009	3.670	121.300

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	12	0.243	0.078	0	100	23.450	96.541	0
0	11	0.240	0.085	5	50	25.175	104.840	9
10	10	0.345	0.114	10	30	35.373	102.408	14
20	9	0.683	0.350	20	15	49.324	72.169	20
30	8	0.619	0.380	30	5	19.952	32.244	29
40	7	0.192	0.158	40	1	1.244	6.478	47
60	6	0.104	0.141	60	0.1	0.163	1.561	84
80	5	0.035	0.089					
100	4	0.025	0.105					
150	3	0.011	0.077					
200	2	0.005	0.063					
1000	1	0.002	0.026					

### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 20.02 mg m-2      Carbon Fixation: 1143.2 mg m-2  
 Phaeophytin: 10.79 mg m-2      Productivity Index: 57.10

\* **Abbreviations:** *DEP* Depth, *PRESS* Pressure, *BTL* Bottle, *TEMP* Temperature, *SAL* Salinity, *TRANSMISS* Transmissivity, *S.I.* Surface Intensity, *CHL* Chlorophyll *a*, *PHAEO* Phaeophytin, *PROD INDEX* Productivity Index

**Date GMT:** Jul 17, 2010 14:02      **Cruise:** S310      **Latitude:** 36.378      **Year:** 2010  
**Project:** PACOOS      **Station:** NPS3      **Longitude:** -122.958      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 33      **Secchi Depth:** ---      **Day Of Year:** 198

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

# Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.5	12	14.600	33.416	24.837	89	7.245	0.216	0.846	6.111
50	48.5	11	10.865	33.617	25.722	89	19.058	0.897	1.481	19.360
100	99.8	10	9.027	33.869	26.229	90	28.553	0.042	1.924	30.777
200	203.5	9	7.895	34.060	26.551	91	32.979	0.046	2.092	43.564
300	302.4	8	6.729	34.119	26.761	91	37.590	0.003	2.403	59.719
400	403.0	7	6.068	34.190	26.904	91	40.026	0.019	2.641	72.318
500	503.7	6	5.446	34.234	27.015	91	40.969	0.002	3.251	81.607
600	605.4	5	4.933	34.282	27.114	91	42.489	0.000	3.307	94.078
700	708.7	4	4.603	34.337	27.195	91	41.841	0.000	3.293	100.392
795	803.3	3	4.248	34.375	27.263	91	44.320	0.011	3.176	112.195
900	906.9	2	3.932	34.418	27.330	91	43.463	0.000	3.645	114.540
1000	1010.7	1	3.724	34.454	27.380	91	44.367	0.000	3.431	119.492

\* **Abbreviations:** **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 17, 2010 16:02      **Cruise:** S310      **Latitude:** 36.460      **Year:** 2010  
**Project:** PACOOS      **Station:** 67-60      **Longitude:** -122.781      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 34      **Secchi Depth:** 20      **Day Of Year:** 198

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.0	12	14.204	33.510	24.993	90	9.009	0.222	0.947	10.528
5	4.1	11	14.076	33.519	25.027	89	9.263	0.231	1.186	10.746
10	8.5	10	14.097	33.514	25.019	89	9.442	0.246	1.082	10.952
20	19.6	9	12.962	33.564	25.288	89	12.461	0.353	0.960	14.585
30	31.2	8	11.778	33.571	25.521	88	14.479	0.481	1.382	15.992
40	40.3	7	10.969	33.616	25.703	88	18.551	0.705	1.520	19.997
60	60.2	6	9.927	33.723	25.967	90	24.938	0.040	1.946	26.546
80	81.0	5	9.559	33.786	26.077	90	22.836	0.021	1.900	24.465
100	100.2	4	9.266	33.853	26.178	90	27.687	0.016	2.128	31.202
150	151.1	3	8.408	34.015	26.439	91	28.312	0.016	2.251	35.446
200	201.4	2	7.749	34.046	26.562	91	33.000	0.024	2.472	45.578
1000	1010.7	1	3.800	34.468	27.383	91	44.397	0.009	3.475	120.489

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	12	0.393	0.101	0	100	58.091	147.650	0
5	11	0.406	0.136	10	50	46.372	97.493	7
10	10	0.476	0.183	10	30	44.182	92.889	12
20	9	0.462	0.485	20	15	33.322	72.159	19
30	8	0.448	0.306	40	5	24.680	36.606	28
40	7	0.674	0.411	60	1	0.987	8.038	43
60	6	0.123	0.204	80	0.1	0.093	1.676	67
80	5	0.055	0.158					
100	4	0.039	0.152					
150	3	0.006	0.085					
200	2	0.005	0.062					
1000	1	0.001	0.011					

### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 19.70 mg m-2      Carbon Fixation: 1319.7 mg m-2  
 Phaeophytin: 12.77 mg m-2      Productivity Index: 67.01

\* **Abbreviations:** *DEP* Depth, *PRESS* Pressure, *BTL* Bottle, *TEMP* Temperature, *SAL* Salinity, *TRANSMISS* Transmissivity, *S.I.* Surface Intensity, *CHL* Chlorophyll *a*, *PHAEO* Phaeophytin, *PROD INDEX* Productivity Index

**Date GMT:** Jul 17, 2010 18:37      **Cruise:** S310      **Latitude:** 36.548      **Year:** 2010  
**Project:** PACOOS      **Station:** NPS2      **Longitude:** -122.599      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 35      **Secchi Depth:** ---      **Day Of Year:** 198

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

# **Physical and Chemical**

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.6	12	15.188	33.346	24.656	88	3.274	0.159	0.543	1.447
50	49.8	11	9.966	33.458	25.754	90	20.525	0.228	1.658	19.555
100	101.6	10	9.263	33.863	26.186	91	21.881	0.043	1.694	23.384
200	200.3	9	8.312	34.084	26.508	91	25.355	0.000	2.150	32.948
300	302.0	8	6.813	34.088	26.726	91	---	---	---	---
400	402.7	7	6.083	34.131	26.855	91	35.181	0.014	2.742	63.687
500	503.2	6	5.830	34.248	26.980	91	40.617	0.004	3.226	81.458
600	605.9	5	5.357	34.326	27.099	90	41.722	0.000	3.402	94.040
700	706.8	4	4.801	34.364	27.194	91	43.313	0.000	3.437	105.852
800	807.7	3	4.418	34.408	27.271	90	38.211	0.014	3.226	106.366
900	908.1	2	4.157	34.431	27.317	90	44.032	0.001	3.524	119.076
1000	1011.6	1	3.847	34.460	27.372	91	43.913	0.000	3.476	125.169

\* **Abbreviations:** **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 17, 2010 20:26      **Cruise:** S310      **Latitude:** 36.627      **Year:** 2010  
**Project:** PACOOS      **Station:** 67-55      **Longitude:** -122.419      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 36      **Secchi Depth:** 17      **Day Of Year:** 198

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.7	12	14.862	33.323	24.709	87	2.938	0.160	0.469	1.435
5	4.7	11	14.829	33.321	24.715	87	2.698	0.153	0.749	1.090
10	9.2	10	14.614	33.316	24.757	85	2.990	0.167	0.615	1.464
20	20.0	9	13.319	33.359	25.058	85	8.038	0.393	0.785	5.899
30	31.5	8	12.201	33.417	25.322	88	11.554	0.606	1.137	10.284
40	40.2	7	11.960	33.454	25.396	89	12.392	0.610	1.305	10.464
60	60.5	6	10.733	33.683	25.797	90	20.216	0.477	1.602	18.713
80	81.1	5	10.193	33.738	25.934	90	23.337	0.047	1.985	22.879
100	101.3	4	9.538	33.838	26.122	90	26.832	0.085	2.277	29.543
150	150.6	3	9.037	33.990	26.321	90	30.026	0.096	2.444	36.682
200	200.9	2	8.423	34.062	26.474	90	26.957	0.040	2.243	34.876
1000	1010.7	1	3.959	34.453	27.355	91	44.366	0.010	3.471	118.040

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	12	0.914	0.145	0	100	81.563	89.205	0
5	11	1.118	0.226	5	50	93.827	83.960	5
10	10	2.106	0.280	10	30	158.904	75.462	8
20	9	2.549	0.792	20	15	106.694	41.856	12
30	8	0.831	0.495	30	5	24.558	29.545	18
40	7	0.896	0.439	40	1	5.484	6.121	27
60	6	0.093	0.178	60	0.1	0.338	3.628	44
80	5	0.067	0.178					
100	4	0.050	0.163					
150	3	0.033	0.151					
200	2	0.008	0.092					
1000	1	0.001	0.030					

### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 37.26 mg m-2      Carbon Fixation: 1903.7 mg m-2  
 Phaeophytin: 11.85 mg m-2      Productivity Index: 51.09

\* **Abbreviations:** *DEP* Depth, *PRESS* Pressure, *BTL* Bottle, *TEMP* Temperature, *SAL* Salinity, *TRANSMISS* Transmissivity, *S.I.* Surface Intensity, *CHL* Chlorophyll *a*, *PHAEO* Phaeophytin, *PROD INDEX* Productivity Index

**Date GMT:** Jul 17, 2010 23:09      **Cruise:** S310      **Latitude:** 36.707      **Year:** 2010  
**Project:** PACOOS      **Station:** NPS1      **Longitude:** -122.243      **Work Week:** 29  
**Platform:** MCARTHUR II      **Cast:** 37      **Secchi Depth:** ---      **Day Of Year:** 198

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

# **Physical and Chemical**

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.6	12	13.950	33.416	24.974	87	8.486	0.246	0.889	9.069
50	49.8	11	10.962	33.618	25.706	90	18.622	0.634	1.757	17.417
100	101.0	10	9.443	33.871	26.163	90	25.618	0.054	2.070	29.444
200	200.1	9	8.449	34.070	26.476	90	28.845	0.042	2.169	38.127
300	301.4	8	7.467	34.139	26.675	90	34.380	0.051	2.688	54.142
400	403.5	7	6.714	34.202	26.829	90	36.681	0.034	2.908	63.183
500	502.6	6	6.035	34.270	26.971	90	39.482	0.015	3.133	80.014
600	604.6	5	5.557	34.318	27.069	91	41.387	0.003	3.310	89.914
700	705.7	4	5.006	34.354	27.163	90	42.664	0.022	3.442	97.773
800	807.6	3	4.449	34.399	27.260	90	41.060	0.025	3.425	106.201
900	907.8	2	4.110	34.433	27.324	90	43.915	0.021	3.419	116.026
1000	1010.0	1	3.820	34.460	27.375	90	44.308	0.078	3.655	130.257

\* **Abbreviations:** **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 18, 2010 03:13      **Cruise:** S310      **Latitude:** 36.796      **Year:** 2010  
**Project:** PACOOS      **Station:** C1      **Longitude:** -121.847      **Work Week:** 30  
**Platform:** MCARTHUR II      **Cast:** 38      **Secchi Depth:** 5      **Day Of Year:** 199

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.2	12	14.867	33.554	24.886	71	5.140	0.166	0.737	9.196
5	5.0	11	14.834	33.550	24.890	71	7.545	0.170	1.169	11.878
10	10.3	10	13.457	33.559	25.185	78	10.575	0.187	1.275	15.151
20	20.6	9	11.824	33.595	25.531	82	14.621	0.298	1.476	17.300
30	29.7	8	11.306	33.656	25.674	87	16.799	0.332	1.563	19.597
40	40.2	7	11.120	33.742	25.774	86	15.918	0.308	1.725	18.912
60	60.7	6	9.567	33.897	26.163	86	27.008	0.369	2.288	36.539
80	80.6	5	9.177	33.949	26.267	87	22.007	0.250	2.091	28.135
100	100.3	4	9.002	33.977	26.317	88	26.041	0.262	2.293	33.934
150	151.5	3	8.607	34.028	26.419	88	31.256	0.208	2.585	43.447
200	201.8	2	7.681	34.124	26.633	86	24.994	0.101	2.385	40.965
220	223.0	1	7.580	34.134	26.655	85	33.608	0.149	2.788	56.346

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	12	4.138	0.960	0	100	629.378	152.112	0
5	11	4.701	0.905	0	50	594.227	143.616	3
10	10	3.149	1.062	5	30	578.983	123.162	5
20	9	2.170	0.981	5	15	435.668	92.676	8
30	8	1.090	0.624	10	5	141.054	44.788	13
40	7	0.693	0.565	10	1	22.830	7.249	20
60	6	0.373	0.487	20	0.1	1.646	0.759	34
80	5	0.053	0.409					
100	4	0.042	0.342					
150	3	0.032	0.209					
200	2	0.027	0.238					
220	1	0.030	0.229					

### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 77.65 mg m-2      Carbon Fixation: 6427.2 mg m-2  
 Phaeophytin: 20.18 mg m-2      Productivity Index: 82.77

\* **Abbreviations:** *DEP* Depth, *PRESS* Pressure, *BTL* Bottle, *TEMP* Temperature, *SAL* Salinity, *TRANSMISS* Transmissivity, *S.I.* Surface Intensity, *CHL* Chlorophyll *a*, *PHAEO* Phaeophytin, *PROD INDEX* Productivity Index

**Date GMT:** Jul 18, 2010 05:12      **Cruise:** S310      **Latitude:** 36.725      **Year:** 2010  
**Project:** PACOOS      **Station:** H3      **Longitude:** -122.008      **Work Week:** 30  
**Platform:** MCARTHUR II      **Cast:** 39      **Secchi Depth:** 5      **Day Of Year:** 199

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.5	12	13.989	33.634	25.134	81	2.728	0.144	0.636	2.949
5	4.6	11	13.988	33.632	25.133	82	2.765	0.129	0.740	2.990
10	10.3	10	12.947	33.657	25.363	86	6.983	0.263	1.052	6.639
20	19.7	9	12.095	33.669	25.537	87	15.524	0.464	1.549	16.271
30	30.1	8	10.651	33.657	25.792	89	21.395	0.424	1.925	22.221
40	40.3	7	10.226	33.675	25.879	90	23.314	0.295	1.890	24.350
60	60.5	6	9.711	33.742	26.018	90	26.258	0.132	2.027	27.637
80	82.7	5	9.486	33.828	26.122	90	27.084	0.190	2.200	29.804
100	101.5	4	9.228	33.876	26.202	90	28.396	0.199	2.336	33.085
155	153.8	3	8.660	34.028	26.410	90	30.953	0.107	2.517	39.275
200	201.2	2	8.356	34.059	26.481	90	31.981	0.078	2.611	43.146
1000	1010.2	1	3.881	34.452	27.363	86	43.505	0.060	3.543	120.751

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	12	1.579	0.444	0	100	179.748	113.815	0
5	11	1.468	0.512	0	50	265.435	168.070	4
10	10	0.868	0.544	5	30	---	---	8
20	9	0.776	0.628	5	15	190.259	129.562	12
30	8	0.471	0.545	10	5	35.729	41.156	20
40	7	0.434	0.634	10	1	8.270	9.526	33
60	6	0.389	0.566	20	0.1	0.655	0.845	51
80	5	0.127	0.573					
100	4	0.055	0.283					
155	3	0.024	0.241					
200	2	0.010	0.206					
1000	1	0.015	0.170					

### Integrated Values

Integrated to 1.0% of Surface Intensity (S.I.)

Chlorophyll *a*: 38.70 mg m-2      Carbon Fixation: 3189.3 mg m-2  
 Phaeophytin: 16.81 mg m-2      Productivity Index: 82.42

\* **Abbreviations:** *DEP* Depth, *PRESS* Pressure, *BTL* Bottle, *TEMP* Temperature, *SAL* Salinity, *TRANSMISS* Transmissivity, *S.I.* Surface Intensity, *CHL* Chlorophyll *a*, *PHAEO* Phaeophytin, *PROD INDEX* Productivity Index



**Date GMT:** Jul 18, 2010 12:13      **Cruise:** S310      **Latitude:** 36.706      **Year:** 2010  
**Project:** PACOOS      **Station:** MOORING      **Longitude:** -122.027      **Work Week:** 30  
**Platform:** MCARTHUR II      **Cast:** 40      **Secchi Depth:** ---      **Day Of Year:** 199

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

#### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
5	4.0	3	14.188	33.576	25.048	82	---	---	---	---
5	4.1	4	14.187	33.577	25.049	82	---	---	---	---
5	4.3	5	14.191	33.577	25.048	82	---	---	---	---
5	4.0	6	14.181	33.578	25.051	82	---	---	---	---
5	4.2	7	14.183	33.578	25.050	82	---	---	---	---
5	4.0	8	14.177	33.578	25.052	82	---	---	---	---
1000	1010.6	1	3.794	34.461	27.379	89	---	---	---	---
1000	1010.2	2	3.789	34.462	27.380	89	---	---	---	---

#### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
5	7	1.190	0.420	5	50	97.036	81.511	---

\* **Abbreviations:** **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 18, 2010 16:12      **Cruise:** S310      **Latitude:** 36.738      **Year:** 2010  
**Project:** PACOOS      **Station:** H3      **Longitude:** -122.016      **Work Week:** 30  
**Platform:** MCARTHUR II      **Cast:** 41      **Secchi Depth:** ---      **Day Of Year:** 199

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

#### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.3	9	14.493	33.635	25.028	82	---	---	---	---
300	302.9	8	7.260	34.158	26.720	90	---	---	---	---
400	403.7	7	6.739	34.207	26.830	90	---	---	---	---
500	504.1	6	6.053	34.254	26.956	90	---	---	---	---
600	605.1	5	5.223	34.326	27.115	88	---	---	---	---
700	706.4	4	4.797	34.364	27.194	90	---	---	---	---
800	807.3	3	4.405	34.403	27.268	89	---	---	---	---
900	908.2	2	4.138	34.428	27.316	87	---	---	---	---
1000	1010.2	1	3.865	34.453	27.365	86	---	---	---	---

\* **Abbreviations:** **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 18, 2010 20:02      **Cruise:** S310      **Latitude:** 36.624      **Year:** 2010  
**Project:** PACOOS      **Station:** DRIFTER      **Longitude:** -122.031      **Work Week:** 30  
**Platform:** MCARTHUR II      **Cast:** 42      **Secchi Depth:** ---      **Day Of Year:** 199

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

#### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
5	4.5	3	13.783	33.619	25.165	81	---	---	---	---
5	4.6	4	13.924	33.608	25.127	81	---	---	---	---
5	4.8	5	13.957	33.607	25.120	81	---	---	---	---
5	4.5	6	14.008	33.600	25.104	80	---	---	---	---
5	4.6	7	13.988	33.603	25.110	80	---	---	---	---
5	4.8	8	13.934	33.611	25.128	80	---	---	---	---
5	4.2	9	14.002	33.602	25.106	80	---	---	---	---
5	5.2	10	13.958	33.609	25.121	80	---	---	---	---
5	4.5	11	14.010	33.602	25.105	80	---	---	---	---
5	4.5	12	14.018	33.600	25.101	80	---	---	---	---
300	302.6	1	7.366	34.140	26.690	90	---	---	---	---
300	303.1	2	7.360	34.140	26.692	90	---	---	---	---

#### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)
5	7	1.395	0.526

\* Abbreviations: **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 18, 2010 23:42      **Cruise:** S310      **Latitude:** 36.742      **Year:** 2010  
**Project:** PACOOS      **Station:** H3      **Longitude:** -122.022      **Work Week:** 30  
**Platform:** MCARTHUR II      **Cast:** 43      **Secchi Depth:** ---      **Day Of Year:** 199

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

#### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	0.7	4	13.331	33.728	25.342	64	---	---	---	---
0	1.0	5	13.329	33.728	25.342	65	---	---	---	---
0	1.4	6	13.316	33.728	25.344	66	---	---	---	---
20	20.1	3	12.286	33.692	25.519	81	---	---	---	---
1000	1010.7	1	3.814	34.457	27.374	83	---	---	---	---
1000	1010.2	2	3.790	34.460	27.378	82	---	---	---	---

\* Abbreviations: **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 19, 2010 04:10      **Cruise:** S310      **Latitude:** 36.766      **Year:** 2010  
**Project:** PACOOS      **Station:** B1      **Longitude:** -122.125      **Work Week:** 30  
**Platform:** MCARTHUR II      **Cast:** 44      **Secchi Depth:** ---      **Day Of Year:** 200

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

#### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	2.4	9	12.878	33.480	25.240	86	---	---	---	---
40	42.8	8	10.883	33.607	25.712	89	---	---	---	---
45	44.4	7	10.885	33.611	25.714	89	---	---	---	---
525	530.3	6	5.972	34.256	26.968	90	---	---	---	---
530	534.7	5	5.967	34.257	26.970	90	---	---	---	---
645	650.5	3	5.235	34.323	27.111	90	---	---	---	---
645	651.0	4	5.229	34.324	27.112	90	---	---	---	---
1000	1008.3	1	3.908	34.451	27.359	88	---	---	---	---
1000	1007.9	2	3.919	34.450	27.357	88	---	---	---	---

\* **Abbreviations:** **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 19, 2010 05:47      **Cruise:** S310      **Latitude:** 36.693      **Year:** 2010  
**Project:** PACOOS      **Station:** B2      **Longitude:** -122.121      **Work Week:** 30  
**Platform:** MCARTHUR II      **Cast:** 45      **Secchi Depth:** ---      **Day Of Year:** 200

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

#### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	2.3	5	13.082	33.462	25.185	85	---	---	---	---
0	2.7	6	13.081	33.461	25.185	85	---	---	---	---
30	31.2	3	11.340	33.543	25.580	88	---	---	---	---
30	31.7	4	11.331	33.543	25.582	89	---	---	---	---
990	1000.4	2	3.895	34.453	27.362	91	---	---	---	---
995	1004.0	1	3.882	34.454	27.364	91	---	---	---	---

\* **Abbreviations:** **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 19, 2010 07:06      **Cruise:** S310      **Latitude:** 36.635      **Year:** 2010  
**Project:** PACOOS      **Station:** B3      **Longitude:** -122.071      **Work Week:** 30  
**Platform:** MCARTHUR II      **Cast:** 46      **Secchi Depth:** ---      **Day Of Year:** 200

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

#### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
5	4.0	7	12.706	33.592	25.360	78	---	---	---	---
5	3.8	8	12.703	33.592	25.361	79	---	---	---	---
35	33.6	5	10.542	33.604	25.769	90	---	---	---	---
35	33.4	6	10.545	33.604	25.769	90	---	---	---	---
355	357.3	3	7.034	34.185	26.772	90	---	---	---	---
355	356.6	4	7.040	34.185	26.771	90	---	---	---	---
1000	1010.7	2	3.827	34.460	27.374	90	---	---	---	---
1005	1013.8	1	3.812	34.461	27.377	90	---	---	---	---

\* Abbreviations: **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 19, 2010 08:31      **Cruise:** S310      **Latitude:** 36.569      **Year:** 2010  
**Project:** PACOOS      **Station:** B4      **Longitude:** -122.044      **Work Week:** 30  
**Platform:** MCARTHUR II      **Cast:** 47      **Secchi Depth:** ---      **Day Of Year:** 200

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

#### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	2.7	3	14.210	33.584	25.049	78	---	---	---	---
0	3.1	4	13.937	33.599	25.118	82	---	---	---	---
805	811.7	1	4.435	34.402	27.264	89	---	---	---	---
805	813.4	2	4.342	34.412	27.282	89	---	---	---	---

\* Abbreviations: **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 19, 2010 16:02      **Cruise:** S310      **Latitude:** 36.741      **Year:** 2010  
**Project:** PACOOS      **Station:** MOORING      **Longitude:** -122.023      **Work Week:** 30  
**Platform:** MCARTHUR II      **Cast:** 48      **Secchi Depth:** ---      **Day Of Year:** 200

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

#### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	3.1	8	13.120	33.724	25.381	72	---	---	---	---
5	3.9	3	13.132	33.720	25.375	71	---	---	---	---
5	5.0	4	13.133	33.720	25.375	71	---	---	---	---
5	5.0	5	13.131	33.720	25.376	71	---	---	---	---
5	3.8	6	13.126	33.721	25.377	71	---	---	---	---
5	4.5	7	13.118	33.723	25.380	72	---	---	---	---
200	200.8	1	8.167	34.075	26.523	90	---	---	---	---
200	201.0	2	8.164	34.075	26.523	90	---	---	---	---

#### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAE0 (mg m-3)	DEPTH (m)	% S. I.	PRIMARY PRODUCTION (mg m-3)	PROD INDEX (carbon/chl ratio)	LIGHT DEPTH (m)
0	8	8.506	2.547	5	50	500.431	58.834	---

\* **Abbreviations:** **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAE0** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 19, 2010 19:11      **Cruise:** S310      **Latitude:** 36.720      **Year:** 2010  
**Project:** PACOOS      **Station:** DRIFTER      **Longitude:** -122.010      **Work Week:** 30  
**Platform:** MCARTHUR II      **Cast:** 49      **Secchi Depth:** ---      **Day Of Year:** 200

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

#### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
5	4.4	3	13.071	33.718	25.386	77	---	---	---	---
5	4.6	4	13.063	33.720	25.388	77	---	---	---	---
5	4.6	5	13.079	33.720	25.385	77	---	---	---	---
5	4.3	6	13.085	33.720	25.384	77	---	---	---	---
5	4.5	7	13.085	33.720	25.384	77	---	---	---	---
5	4.4	8	13.079	33.721	25.386	77	---	---	---	---
995	1005.2	1	3.872	34.452	27.364	86	---	---	---	---
995	1005.3	2	3.871	34.452	27.364	86	---	---	---	---

#### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAE0 (mg m-3)
5	8	9.913	2.001

\* **Abbreviations:** **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAE0** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 19, 2010 23:08      **Cruise:** S310      **Latitude:** 36.742      **Year:** 2010  
**Project:** PACOOS      **Station:** H3      **Longitude:** -122.022      **Work Week:** 30  
**Platform:** MCARTHUR II      **Cast:** 50      **Secchi Depth:** ---      **Day Of Year:** 200

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

#### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.3	10	12.613	33.601	25.385	73	---	---	---	---
5	4.9	4	12.620	33.601	25.384	74	---	---	---	---
5	4.8	5	12.621	33.601	25.384	74	---	---	---	---
5	5.1	6	12.613	33.601	25.385	73	---	---	---	---
5	5.0	7	12.611	33.601	25.386	74	---	---	---	---
5	4.8	8	12.613	33.601	25.385	74	---	---	---	---
5	5.4	9	12.613	33.601	25.385	74	---	---	---	---
10	10.8	3	12.531	33.598	25.399	72	---	---	---	---
1000	1011.5	1	4.011	34.439	27.339	85	---	---	---	---
1000	1012.0	2	4.010	34.439	27.339	85	---	---	---	---

\* Abbreviations: **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAE** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 20, 2010 02:35      **Cruise:** S310      **Latitude:** 36.647      **Year:** 2010  
**Project:** PACOOS      **Station:** DRIFTER      **Longitude:** -121.987      **Work Week:** 30  
**Platform:** MCARTHUR II      **Cast:** 51      **Secchi Depth:** ---      **Day Of Year:** 201

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

#### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	2.0	8	13.597	33.686	25.255	65	---	---	---	---
0	2.1	9	13.602	33.686	25.254	65	---	---	---	---
5	5.0	3	13.607	33.685	25.252	64	---	---	---	---
5	4.7	4	13.607	33.685	25.252	66	---	---	---	---
5	4.7	5	13.611	33.685	25.251	65	---	---	---	---
5	4.7	6	13.610	33.685	25.252	66	---	---	---	---
5	4.5	7	13.608	33.686	25.252	65	---	---	---	---
85	86.1	1	9.349	33.892	26.194	89	---	---	---	---
85	86.1	2	9.347	33.892	26.195	89	---	---	---	---

#### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAE (mg m-3)
0	8	14.961	2.437

\* Abbreviations: **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAE** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 20, 2010 07:06      **Cruise:** S310      **Latitude:** 36.577      **Year:** 2010  
**Project:** PACOOS      **Station:** DRIFTER      **Longitude:** -122.012      **Work Week:** 30  
**Platform:** MCARTHUR II      **Cast:** 52      **Secchi Depth:** ---      **Day Of Year:** 201

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.8	11	13.922	33.670	25.176	72	---	---	---	---
0	2.2	12	13.923	33.670	25.176	72	---	---	---	---
5	4.6	5	13.913	33.663	25.172	72	---	---	---	---
5	4.7	6	13.915	33.665	25.173	72	---	---	---	---
5	4.4	7	13.915	33.667	25.175	72	---	---	---	---
5	3.9	8	13.913	33.667	25.175	72	---	---	---	---
5	4.8	9	13.911	33.667	25.176	72	---	---	---	---
5	4.4	10	13.906	33.666	25.176	72	---	---	---	---
200	201.4	3	7.990	34.102	26.570	90	---	---	---	---
210	209.7	4	7.962	34.106	26.577	90	---	---	---	---
350	355.4	1	7.018	34.190	26.779	90	---	---	---	---
350	354.0	2	7.011	34.191	26.780	90	---	---	---	---

### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)
5	10	8.598	1.939

\* Abbreviations: **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 20, 2010 12:07      **Cruise:** S310      **Latitude:** 36.495      **Year:** 2010  
**Project:** PACOOS      **Station:** DRIFTER      **Longitude:** -122.037      **Work Week:** 30  
**Platform:** MCARTHUR II      **Cast:** 53      **Secchi Depth:** ---      **Day Of Year:** 201

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

#### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
5	4.7	3	13.408	33.621	25.243	83	---	---	---	---
5	5.4	4	12.966	33.630	25.338	83	---	---	---	---
5	4.9	5	13.162	33.630	25.300	83	---	---	---	---
5	4.9	6	13.322	33.626	25.265	83	---	---	---	---
5	4.6	7	13.519	33.626	25.225	83	---	---	---	---
5	5.3	8	13.510	33.629	25.229	83	---	---	---	---
505	509.9	1	5.919	34.271	26.987	90	---	---	---	---
505	510.0	2	5.917	34.271	26.987	90	---	---	---	---

#### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)
5	7	1.147	0.595

\* **Abbreviations:** **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 20, 2010 15:00      **Cruise:** S310      **Latitude:** 36.745      **Year:** 2010  
**Project:** PACOOS      **Station:** DRIFTER      **Longitude:** -122.024      **Work Week:** 30  
**Platform:** MCARTHUR II      **Cast:** 54      **Secchi Depth:** ---      **Day Of Year:** 201

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

#### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
5	5.6	3	12.374	33.658	25.476	85	---	---	---	---
5	5.2	4	12.371	33.653	25.472	86	---	---	---	---
5	5.0	5	12.371	33.653	25.472	86	---	---	---	---
5	5.0	6	12.371	33.652	25.472	86	---	---	---	---
5	5.3	7	12.372	33.652	25.472	86	---	---	---	---
5	5.0	8	12.372	33.652	25.472	86	---	---	---	---
200	202.5	1	8.019	34.088	26.555	90	---	---	---	---
200	202.6	2	8.018	34.088	26.555	90	---	---	---	---

#### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)
5	8	2.598	1.939

\* **Abbreviations:** **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index



**Date GMT:** Jul 20, 2010 19:08      **Cruise:** S310      **Latitude:** 36.718      **Year:** 2010  
**Project:** PACOOS      **Station:** DRIFTER      **Longitude:** -122.007      **Work Week:** 30  
**Platform:** MCARTHUR II      **Cast:** 55      **Secchi Depth:** ---      **Day Of Year:** 201

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

#### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
5	5.8	3	12.400	33.670	25.480	81	---	---	---	---
5	5.8	4	12.406	33.668	25.477	81	---	---	---	---
5	5.0	5	12.409	33.660	25.470	82	---	---	---	---
5	5.2	6	12.410	33.658	25.469	82	---	---	---	---
5	5.6	7	12.399	33.665	25.476	82	---	---	---	---
5	5.6	8	12.410	33.665	25.474	81	---	---	---	---
200	202.1	1	8.038	34.094	26.557	90	---	---	---	---
200	201.8	2	8.036	34.094	26.557	90	---	---	---	---

#### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)
5	8	3.142	0.932

\* **Abbreviations:** **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Date GMT:** Jul 21, 2010 02:35      **Cruise:** S310      **Latitude:** 36.669      **Year:** 2010  
**Project:** PACOOS      **Station:** DRIFTER      **Longitude:** -121.992      **Work Week:** 30  
**Platform:** MCARTHUR II      **Cast:** 56      **Secchi Depth:** ---      **Day Of Year:** 202

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

#### Physical and Chemical

DEP (m)	PRESS (dbar)	BTL #	TEMP (°C)	SAL	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.5	9	13.018	33.706	25.387	66	---	---	---	---
5	4.3	3	12.980	33.695	25.386	67	---	---	---	---
5	4.0	4	12.979	33.698	25.388	67	---	---	---	---
5	4.0	5	12.988	33.699	25.388	67	---	---	---	---
5	4.1	6	12.996	33.702	25.388	67	---	---	---	---
5	4.3	7	12.996	33.702	25.388	66	---	---	---	---
5	4.4	8	12.998	33.702	25.388	67	---	---	---	---
100	101.8	1	8.760	34.000	26.373	89	---	---	---	---
100	102.0	2	8.758	34.000	26.374	89	---	---	---	---

#### Biological

DEP (m)	BTL #	CHL (mg m-3)	PHAEO (mg m-3)
5	8	14.931	2.237

\* **Abbreviations:** **DEP** Depth, **PRESS** Pressure, **BTL** Bottle, **TEMP** Temperature, **SAL** Salinity, **TRANSMISS** Transmissivity, **S.I.** Surface Intensity, **CHL** Chlorophyll a, **PHAEO** Phaeophytin, **PROD INDEX** Productivity Index

**Table A4:** *Marine mammal observations.* This table lists the results of the marine mammal observations made during the PaCOOS cruise of July 2010. The data are listed alphabetically by species' scientific name, then chronologically within each species. (Dates are in local time.)

Species Code	Scientific Name	Group Size	Sighting Number	Date (m/dd/yyyy)	North Latitude (dd mm.mmm)	West Longitude (ddd mm.mmm)
71	<i>Balaenoptera acutorostrata</i>	1	21	7/13/2010	37° 20.820	124° 11.340
71	<i>Balaenoptera acutorostrata</i>	1	100	7/20/2010	36° 36.720	121° 53.700
71	<i>Balaenoptera acutorostrata</i>	1	101	7/20/2010	36° 38.820	121° 56.940
75	<i>Balaenoptera musculus</i>	2	11	7/12/2010	37° 53.100	123° 00.420
75	<i>Balaenoptera musculus</i>	1	18	7/12/2010	37° 51.780	123° 03.600
75	<i>Balaenoptera musculus</i>	2	19	7/12/2010	37° 51.780	123° 03.600
75	<i>Balaenoptera musculus</i>	2	42	7/17/2010	36° 46.740	121° 53.400
75	<i>Balaenoptera musculus</i>	1	53	7/18/2010	36° 37.860	122° 03.840
75	<i>Balaenoptera musculus</i>	2	55	7/18/2010	36° 36.600	122° 02.400
75	<i>Balaenoptera musculus</i>	10	56	7/18/2010	36° 41.400	122° 00.420
75	<i>Balaenoptera musculus</i>	4	67	7/19/2010	36° 40.380	121° 58.080
75	<i>Balaenoptera musculus</i>	2	68	7/19/2010	36° 39.480	122° 00.180
75	<i>Balaenoptera musculus</i>	2	69	7/19/2010	36° 38.520	121° 58.260
75	<i>Balaenoptera musculus</i>	1	70	7/19/2010	36° 39.120	121° 59.340
75	<i>Balaenoptera musculus</i>	2	71	7/19/2010	36° 39.060	121° 59.520
75	<i>Balaenoptera musculus</i>	2	74	7/19/2010	36° 37.440	121° 59.160
75	<i>Balaenoptera musculus</i>	1	86	7/20/2010	36° 40.800	121° 58.080
75	<i>Balaenoptera musculus</i>	2	88	7/20/2010	36° 38.760	121° 55.500
75	<i>Balaenoptera musculus</i>	2	89	7/20/2010	36° 41.100	121° 59.940
75	<i>Balaenoptera musculus</i>	2	90	7/20/2010	36° 39.600	121° 57.960
75	<i>Balaenoptera musculus</i>	1	93	7/20/2010	36° 41.100	121° 58.200

Species Code	Scientific Name	Group Size	Sighting Number	Date (m/dd/yyyy)	North Latitude (dd mm.mmm)	West Longitude (ddd mm.mmm)
21	<i>Grampus griseus</i>	48	27	7/15/2010	35° 36.960	124° 54.300
21	<i>Grampus griseus</i>	12	33	7/17/2010	36° 38.880	121° 50.220
21	<i>Grampus griseus</i>	6	41	7/17/2010	36° 45.780	121° 58.560
21	<i>Grampus griseus</i>	5	62	7/18/2010	36° 44.760	121° 58.740
21	<i>Grampus griseus</i>	45	65	7/19/2010	36° 43.140	122° 01.260
21	<i>Grampus griseus</i>	60	77	7/20/2010	36° 45.000	122° 01.020
21	<i>Grampus griseus</i>	6	92	7/20/2010	36° 41.160	121° 58.140
21	<i>Grampus griseus</i>	16	103	7/20/2010	36° 41.100	121° 59.280
22	<i>Lagenorhynchus obliquidens</i>	9	23	7/13/2010	37° 06.900	124° 41.760
22	<i>Lagenorhynchus obliquidens</i>	165	32	7/17/2010	36° 38.880	121° 50.220
22	<i>Lagenorhynchus obliquidens</i>	20	81	7/20/2010	36° 44.160	122° 00.360
27	<i>Lissodelphis borealis</i>	130	34	7/17/2010	36° 42.480	122° 14.640
76	<i>Megaptera novaeangliae</i>	1	4	7/12/2010	37° 48.480	122° 43.260
76	<i>Megaptera novaeangliae</i>	1	5	7/12/2010	37° 55.200	122° 51.600
76	<i>Megaptera novaeangliae</i>	1	7	7/12/2010	37° 53.940	122° 58.620
76	<i>Megaptera novaeangliae</i>	2	8	7/12/2010	37° 53.760	122° 59.040
76	<i>Megaptera novaeangliae</i>	3	9	7/12/2010	37° 53.760	122° 59.040
76	<i>Megaptera novaeangliae</i>	3	10	7/12/2010	37° 53.880	123° 00.600
76	<i>Megaptera novaeangliae</i>	2	12	7/12/2010	37° 52.800	123° 01.320
76	<i>Megaptera novaeangliae</i>	3	13	7/12/2010	37° 52.680	123° 00.960
76	<i>Megaptera novaeangliae</i>	4	14	7/12/2010	37° 52.620	123° 01.800
76	<i>Megaptera novaeangliae</i>	6	15	7/12/2010	37° 52.380	123° 02.340
76	<i>Megaptera novaeangliae</i>	2	16	7/12/2010	37° 52.020	123° 03.300
76	<i>Megaptera novaeangliae</i>	2	17	7/12/2010	37° 52.020	123° 03.300
76	<i>Megaptera novaeangliae</i>	1	31	7/17/2010	36° 35.460	122° 25.080
76	<i>Megaptera novaeangliae</i>	1	35	7/17/2010	36° 43.860	122° 14.220
76	<i>Megaptera novaeangliae</i>	1	36	7/17/2010	36° 44.340	122° 13.320
76	<i>Megaptera novaeangliae</i>	4	37	7/17/2010	36° 45.960	122° 13.440
76	<i>Megaptera novaeangliae</i>	4	38	7/17/2010	36° 48.000	122° 09.600
76	<i>Megaptera novaeangliae</i>	1	39	7/17/2010	36° 45.120	122° 05.820
76	<i>Megaptera novaeangliae</i>	1	40	7/17/2010	36° 45.060	122° 02.880

Species Code	Scientific Name	Group Size	Sighting Number	Date (m/dd/yyyy)	North Latitude (dd mm.mmm)	West Longitude (ddd mm.mmm)
76	<i>Megaptera novaeangliae</i>	2	43	7/18/2010	36° 42.660	122° 01.020
76	<i>Megaptera novaeangliae</i>	3	44	7/18/2010	36° 42.420	122° 09.600
76	<i>Megaptera novaeangliae</i>	2	45	7/18/2010	36° 42.000	122° 01.680
76	<i>Megaptera novaeangliae</i>	2	46	7/18/2010	36° 42.300	122° 02.100
76	<i>Megaptera novaeangliae</i>	2	47	7/18/2010	36° 41.280	122° 03.000
76	<i>Megaptera novaeangliae</i>	2	48	7/18/2010	36° 39.540	122° 01.380
76	<i>Megaptera novaeangliae</i>	2	49	7/18/2010	36° 39.600	122° 01.260
76	<i>Megaptera novaeangliae</i>	2	50	7/18/2010	36° 39.060	122° 01.740
76	<i>Megaptera novaeangliae</i>	5	51	7/18/2010	36° 38.820	122° 01.740
76	<i>Megaptera novaeangliae</i>	1	52	7/18/2010	36° 36.240	122° 04.260
76	<i>Megaptera novaeangliae</i>	11	57	7/18/2010	36° 38.640	121° 59.460
76	<i>Megaptera novaeangliae</i>	2	58	7/18/2010	36° 47.340	121° 59.700
76	<i>Megaptera novaeangliae</i>	3	59	7/18/2010	36° 45.480	122° 00.780
76	<i>Megaptera novaeangliae</i>	2	60	7/18/2010	36° 46.080	121° 58.440
76	<i>Megaptera novaeangliae</i>	3	61	7/18/2010	36° 46.680	121° 54.240
76	<i>Megaptera novaeangliae</i>	3	64	7/19/2010	36° 47.220	121° 59.760
76	<i>Megaptera novaeangliae</i>	1	66	7/19/2010	36° 43.620	-122° 01.980
76	<i>Megaptera novaeangliae</i>	2	75	7/19/2010	36° 38.880	121° 57.540
76	<i>Megaptera novaeangliae</i>	1	76	7/20/2010	36° 44.400	122° 00.540
76	<i>Megaptera novaeangliae</i>	1	78	7/20/2010	36° 46.020	122° 02.040
76	<i>Megaptera novaeangliae</i>	2	79	7/20/2010	36° 44.700	121° 58.740
76	<i>Megaptera novaeangliae</i>	2	80	7/20/2010	36° 43.980	122° 00.060
76	<i>Megaptera novaeangliae</i>	2	82	7/20/2010	36° 40.800	122° 01.500
76	<i>Megaptera novaeangliae</i>	2	83	7/20/2010	36° 41.280	122° 00.960
76	<i>Megaptera novaeangliae</i>	1	84	7/20/2010	36° 40.200	121° 59.940
76	<i>Megaptera novaeangliae</i>	2	85	7/20/2010	36° 39.960	121° 59.880
76	<i>Megaptera novaeangliae</i>	2	87	7/20/2010	36° 40.260	121° 56.460
76	<i>Megaptera novaeangliae</i>	3	91	7/20/2010	36° 41.160	121° 58.260
76	<i>Megaptera novaeangliae</i>	1	94	7/20/2010	36° 40.860	121° 53.340
76	<i>Megaptera novaeangliae</i>	3	95	7/20/2010	36° 41.220	121° 58.440
76	<i>Megaptera novaeangliae</i>	2	96	7/20/2010	36° 41.580	121° 58.320
76	<i>Megaptera novaeangliae</i>	2	98	7/20/2010	36° 47.040	121° 59.580
76	<i>Megaptera novaeangliae</i>	3	99	7/20/2010	36° 46.200	122° 01.320
110	<i>Orcinus orca</i>	7	6	7/12/2010	37° 54.540	122° 57.180

Species Code	Scientific Name	Group Size	Sighting Number	Date (m/dd/yyyy)	North Latitude (dd mm.mmm)	West Longitude (ddd mm.mmm)
40	<i>Phocoena phocoena</i>	2	1	7/12/2010	37° 49.440	122° 23.520
40	<i>Phocoena phocoena</i>	2	2	7/12/2010	37° 48.960	122° 28.560
40	<i>Phocoena phocoena</i>	1	3	7/12/2010	37° 47.400	122° 40.500
40	<i>Phocoena phocoena</i>	1	102	7/20/2010	36° 38.760	121° 57.000
44	<i>Phocoenoides dalli</i>	4	20	7/13/2010	37° 23.700	124° 05.940
44	<i>Phocoenoides dalli</i>	9	24	7/13/2010	36° 59.040	124° 58.380
44	<i>Phocoenoides dalli</i>	5	30	7/17/2010	36° 30.420	122° 39.660
5	unidentified <i>Delphinus sp.</i>	57	26	7/14/2010	36° 18.360	125° 31.860
79	unidentified large whale	2	54	7/18/2010	36° 35.220	122° 04.500
79	unidentified large whale	1	63	7/18/2010	36° 46.080	121° 58.800
79	unidentified large whale	2	97	7/20/2010	36° 40.800	121° 54.540

Species Code	Scientific Name	Group Size	Sighting Number	Date (m/dd/yyyy)	North Latitude (dd mm.mmm)	West Longitude (ddd mm.mmm)
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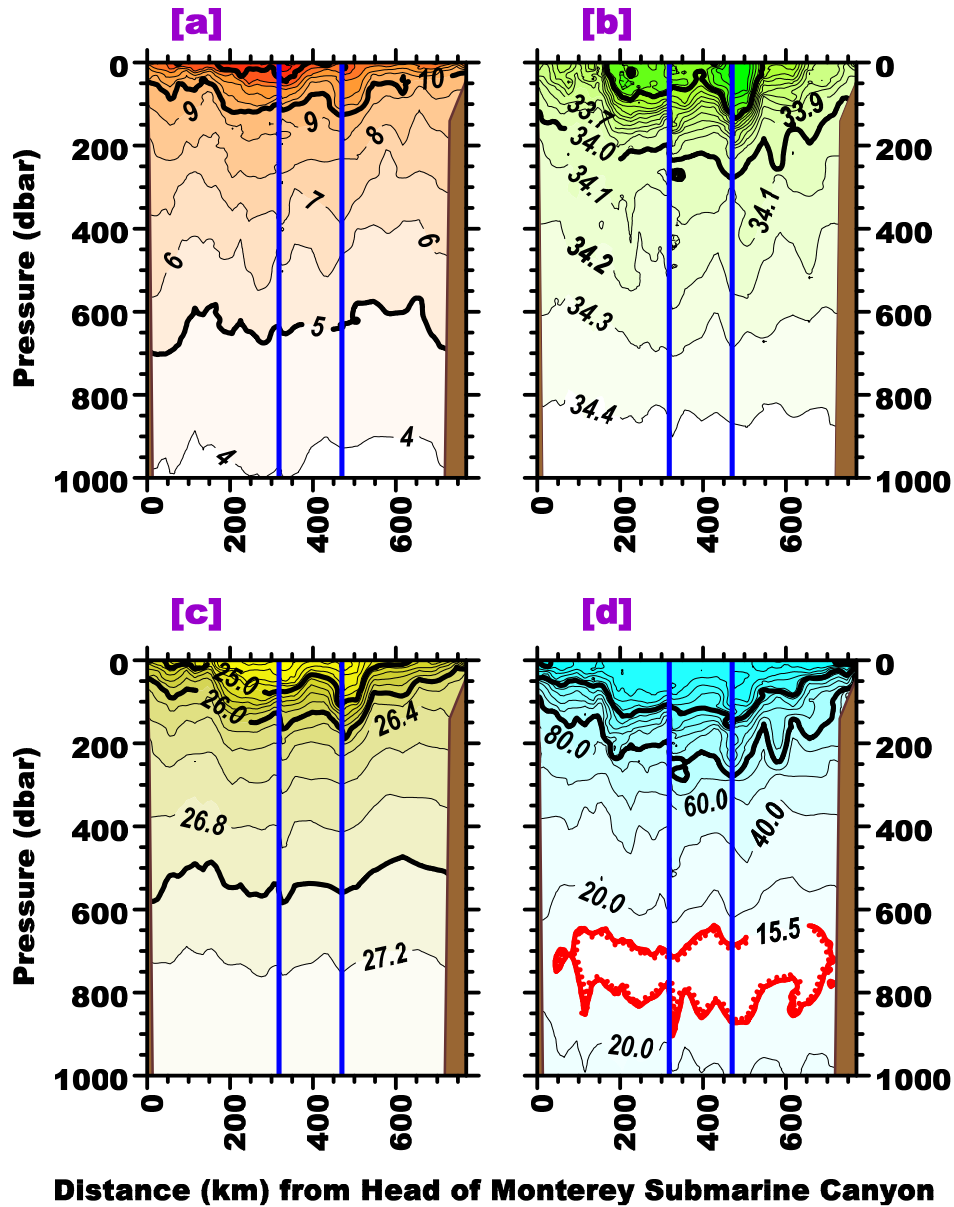
#### PINNIPEDS and SOUTHERN SEA OTTERS

CU	<i>Callorhinus ursinus</i>	1	22	7/13/2010	37° 09.900	124° 35.700
CU	<i>Callorhinus ursinus</i>	1	25	7/13/2010	37° 03.360	125° 14.460
CU	<i>Callorhinus ursinus</i>	1	28	7/17/2010	36° 25.080	122° 52.380
CU	<i>Callorhinus ursinus</i>	1	29	7/17/2010	36° 28.260	122° 46.560

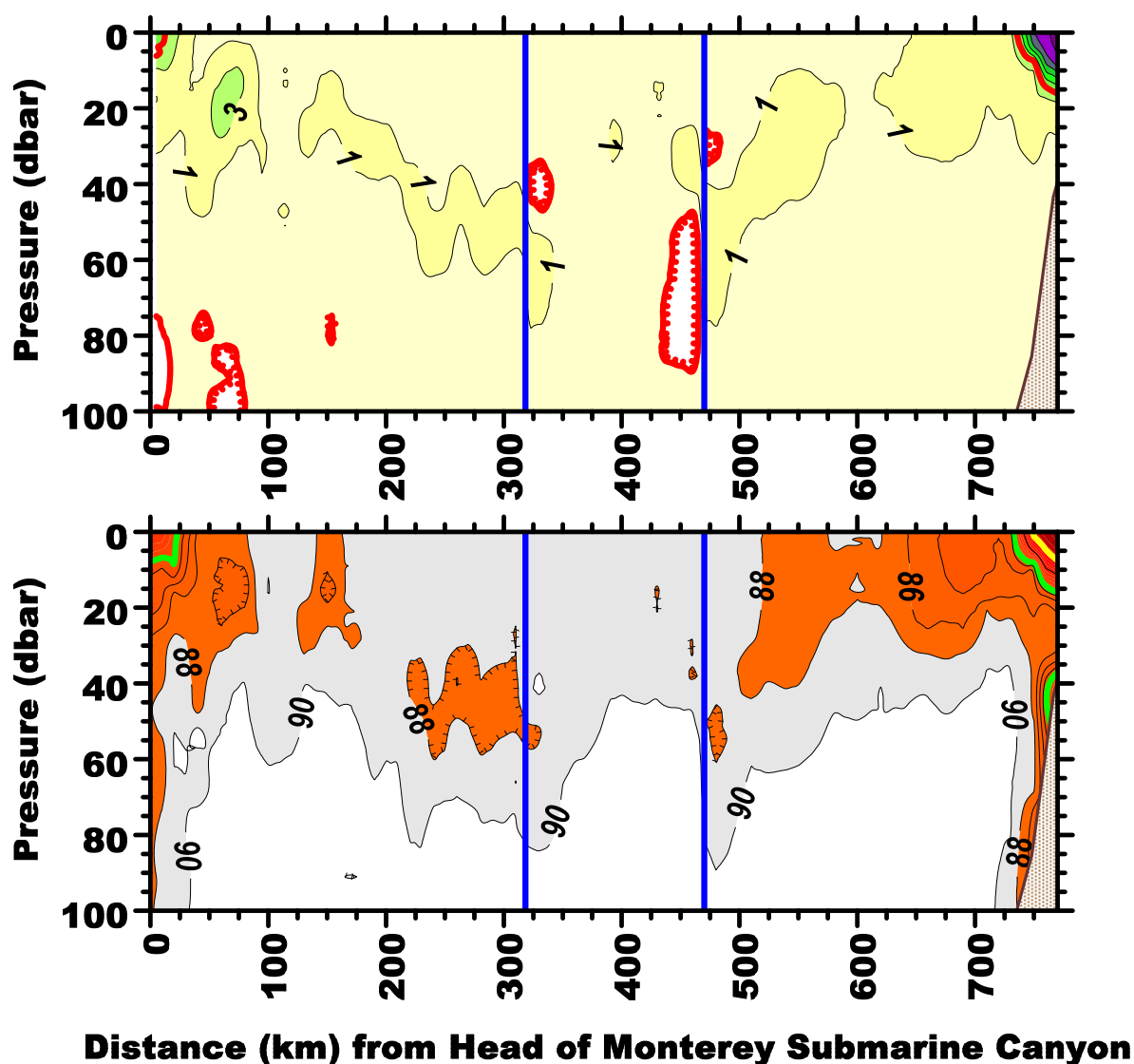
**Table A5:** *Summary of marine mammal observations.* This table summarizes the results of the marine mammal observations made during the PaCOOS cruise of July 2010. The data are listed alphabetically by species' scientific name.

Species Code	Scientific Name	Total sightings	Total animals
71	<i>Balaenoptera acutorostrata</i>	3	3
75	<i>Balaenoptera musculus</i>	18	41
21	<i>Grampus griseus</i>	8	198
22	<i>Lagenorhynchus obliquidens</i>	3	194
27	<i>Lissodelphis borealis</i>	1	130
76	<i>Megaptera novaeangliae</i>	52	122
110	<i>Orcinus orca</i>	1	7
40	<i>Phocoena phocoena</i>	4	6
44	<i>Phocoenoides dalli</i>	3	18
5	unidentified <i>Delphinus</i> sp.	1	57
79	unidentified large whale	3	5
<b>Total number of cetaceans</b>			<b><u>781</u></b>

## Appendix B

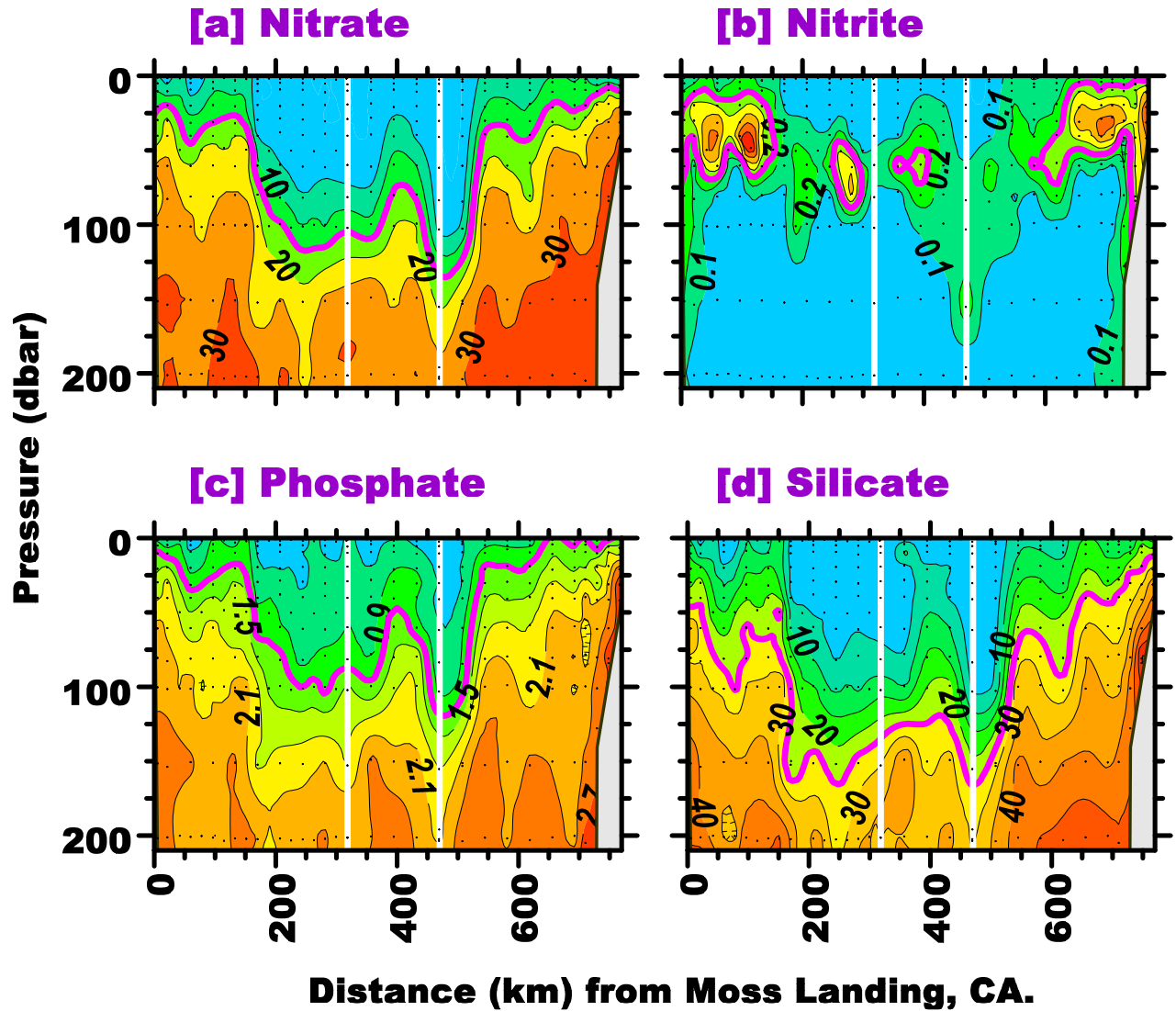


**Figure 7:** Contours of (a) temperature ( $^{\circ}\text{C}$ ), (b) salinity, (c) density anomaly ( $\text{kg m}^{-3}$ ), and (d) oxygen ( $\mu\text{mol kg}^{-1}$ ) fields along the line of hydrographic stations from Moss Landing, California (on the left) to Drakes Bay, California (on the right). The blue lines indicate (from left to right) the turning points at CalCOFI 67-90 and 60-90. Contour intervals for panels a-d are  $1^{\circ}\text{C}$ ,  $0.1$ ,  $0.2 \text{ kg m}^{-3}$ , and  $20 \mu\text{mol kg}^{-1}$ , respectively, except that the (nearly) oxygen minimum contour of  $15.5 \mu\text{mol kg}^{-1}$  is highlighted in red in panel d. Other highlighted contours are  $5^{\circ}$ ,  $10^{\circ}$ , and  $15^{\circ}\text{C}$  (upper left),  $33.5$  and  $34$  (upper right),  $25$ ,  $26$ , and  $27 \text{ kg m}^{-3}$  (lower left), and  $100$ ,  $200$ , and  $300 \mu\text{mol kg}^{-1}$  (lower right). Hatched contours indicate “depressions.”

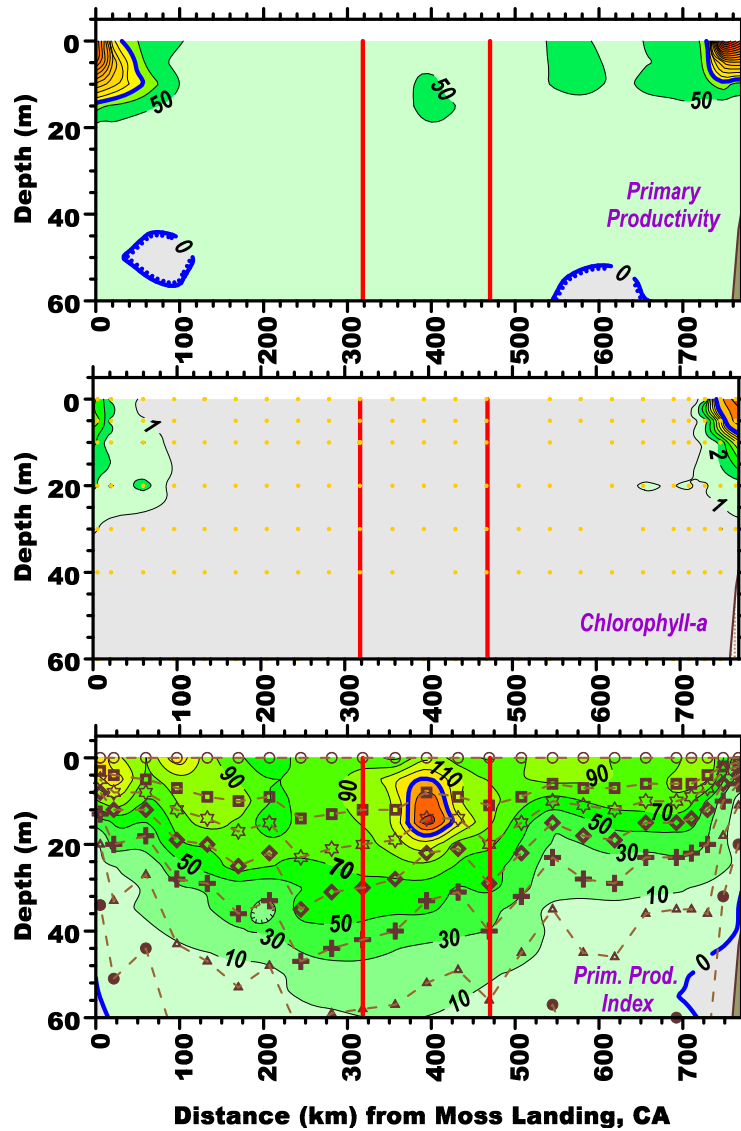


**Figure 8:** *Contours of fluorescence (volts) [upper panel] and transmissivity (percentage) [lower panel] in the upper 100 dbars of the water column along the line of hydrographic stations from Moss Landing, California (on the left) to Drakes Bay, California (on the right). The blue lines indicate (from left to right) the turning points at CalCOFI 67-90 and 60-90. The contour intervals are 2 volts for the upper panel, 10 percent (below 80% transmissivity) and 2 percent (above 80% transmissivity) for the lower panel. 0 and 5 volts (upper panel), while 60% (yellow) and 80% (green) (lower panel), contours are highlighted. Hatched contours indicate “depressions.”*





**Figure 9:** Contours of (a) nitrate ( $\mu\text{M}$ ), (b) nitrite ( $\mu\text{M}$ ), (c) phosphate ( $\mu\text{M}$ ), and (d) silicate ( $\mu\text{M}$ ) fields along the line of hydrographic stations from Moss Landing, California (on the left) to Drakes Bay, California (on the right). The white lines indicate (from left to right) the turning points at CalCOFI 67-90 and 60-90. The dots indicate the water sample locations. Contour intervals for panels a-d are  $5\mu\text{M}$ ,  $0.1\mu\text{M}$ ,  $0.3\mu\text{M}$ , and  $5\mu\text{M}$ , respectively. Highlighted contours are  $15\mu\text{M}$ ,  $0.3\mu\text{M}$ ,  $1.2\mu\text{M}$ , and  $25\mu\text{M}$  for panels a-d, respectively.



**Figure 10:** Contours of primary productivity ( $\text{mg Carbon m}^{-3}$ ) [**upper panel**], chlorophyll-a ( $\text{mg m}^{-3}$ ) [**middle panel**], and primary productivity index (ratio of  $\text{mg Carbon m}^{-3}$  to  $\text{mg Chlorophyll-a m}^{-3}$ ) [**lower panel**] in the upper 60 m of the water column along the line of hydrographic stations from Moss Landing, California (on the left) to Drakes Bay, California (on the right). The red lines indicate (from left to right) the turning points at CalCOFI 67-90 and 60-90. Dots [**middle panel**] indicate the water sample locations for chl-a. Primary productivity samples are taken by the percentage of the surface light intensity level (light penetration depth). (Light penetration) depths of those light intensity levels are shown [**lower panel**] by the various symbols, with like symbols connected by dashed lines. (100% = open circles, 50% = open squares, 30% = open stars, 15% = open diamonds, 5% = plusses, 1% = open triangles, 0.1% = filled circles.) The contour intervals are  $50 \text{ mg C m}^{-3}$ ,  $1 \text{ mg m}^{-3}$ , and 20, respectively, for the upper, middle, and lower panels, except that the 0 contour is included and highlighted in the lower panel. Other highlighted contours are 0 and  $150 \text{ mg C m}^{-3}$  [**upper**],  $10 \text{ mg m}^{-3}$  [**middle**], and 150 [**lower**].

## Appendix C

The following is the introduction from the manual for the SeaTech transmissometer that was mounted on the CTD during the PaCOOS cruise of July 2010.

The Sea Tech 25 cm pathlength transmissometer has been designed to provide accurate in situ measurements of beam transmission and the concentration of suspended matter in relatively clear waters.

The two basic processes that alter the underwater distribution of light are absorption and scattering. Absorption is a change of light energy into other forms of energy whereas scattering entails a change in direction of the light without loss of energy.

In a pure absorbing medium, the loss of light due to absorption in a well-collimated beam of monochromatic light will be given by  $I(z) = I(0)e^{-az}$ , where "a" is the absorption coefficient with units of  $m^{-1}$ . Similarly, in a pure scattering medium, the light redirected from a well-collimated beam of monochromatic light will be given by  $I(z) = I(0)e^{-bz}$ , where "b" is the volume scattering coefficient with units of  $m^{-1}$ . Since attenuation is defined as the sum of absorption and scattering, we get  $a + b = c$ , where "c" is the beam attenuation coefficient.

The light lost from a well-collimated monochromatic beam of light in a scattering and absorbing medium is thus given by  $I(z) = I(0)e^{-cz}$ . This can be rewritten as  $T(z) = I(z)/I(0) = e^{-cz}$ , where  $T(z)$  is the percent light transmitted over a distance, "z". It should be noted that transmission is always over a given distance, whereas the beam attenuation coefficient, "c", is independent of distance. "c" is computed by  $-\ln(T)/z$ , where z is the pathlength of the instrument.

The simple exponential relationship holds only if the light is monochromatic. The Sea Tech transmissometer employs a light emitting diode (LED) light source with a wavelength of 660 nm, which is in the red part of the spectrum. This LED is nearly monochromatic.

A beam attenuation coefficient, "c", can be divided into three parts: 1) That due to water,  $c_w$ ; 2) that due to suspended particulate matter,  $c_p$ ; and 3) that due to dissolved materials (mostly humic acids or "yellow matter"),  $c_y$ . Hence,  $c = c_w + c_p + c_y$ . Each of these components has distinct spectral characteristics. Yellow matter absorbs strongly in the blue part of the spectrum. This absorption decreases exponentially with increasing wavelengths. The beam attenuation coefficient for particulate matter is much less wavelength dependent. It varies approximately as  $\lambda^{-1}$ . The attenuation spectrum of natural waters is a composite of the three components, depending on the relative concentrations. The yellow matter is a by-product of organic decay and can be present in large amounts in lakes, reservoirs, and near-shore waters. At 660 nm, the attenuation of yellow matter is negligible, however, so that the attenuation is due to particulate matter and sea water only.

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